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Memorandum

ON THE

TREATMENT OF INFECTED WOUNDS BY PHYSIOLOGICAL METHODS.

(DRAINAGE OF INFECTED TISSUES BY HYPERTONIC SALT SOLUTION, AND UTILISATION OF THE ANTIBACTERIAL POWERS OF THE BLOOD FLUIDS AND WHITE BLOOD CORPUSCLES.)

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1. INTRODUCTORY.

THE treatment of septic war wounds divides itself naturally into three therapeutic procedures:—

(1) In the *first* we have a number of different aims to pursue concurrently: we have to promote the destruction of the microbes which have been carried into the deeper tissues; we have to re-establish normal conditions in those tissues, resolving the infiltration in the walls of the wound, and getting rid of the infected sloughs; and we have to prevent "the corruption of the discharges," and inhibit microbic growth in the cavity of the wound.

Further, during the whole period occupied by these operations we have to be constantly on our guard to prevent active and passive movements which would propel bacteria along the lymphatics and carry poisonous bacterial products into the blood.

(2) When the microbes in the deeper tissues have been exterminated and physiological conditions have been restored, and the wound has been rendered to naked-eye inspection perfectly clean, the difficult portion of our task has been accomplished, and the time has come for dealing with the surface infection.

(3) As soon as this has been suppressed, or all but suppressed, all our thought ought to be given to promoting the processes of repair, bringing together the tissues, and covering over the denuded surfaces.

2. INADEQUACY OF THE TRADITIONAL METHOD OF TREATING WOUNDS BY ANTISEPTIC APPLICATIONS, INCISION, AND MECHANICAL DRAINAGE.

Inefficacy of antiseptic applications.—The ordinary antiseptic combines with every kind of albumen. It thereby loses its bactericidal and its penetrative power. Its *bactericidal power* is, of course, not finally abolished until the antiseptic has encountered and combined with its full complement of albumen. Its *penetrative power*—and penetrative power means capacity for diffusing outwards through any medium in a chemically active condition—is, in the fluids of the wound, very rapidly abolished. For, when the medium which is to be penetrated contains even a trace of albumen, this will immediately quench the "*antiseptic emanation*"—meaning by this that fractional quantum of antiseptic which is carried out by diffusion into the surrounding fluids.

These general truths are firmly based upon experiment. It can be demonstrated that none of our ordinary antiseptics extirpate microbes enveloped in dead or living tissues, or in serous or purulent discharges; and that none diffuse into the walls or recesses of the wound. The sterilising action of antiseptics applied in the wound will thus be strictly limited to the destruction of any microbes which may be lying bare; and sterilisation will not extend beyond that portion of the wound surface to which the antiseptic is actually applied.

Inadequacy of drainage as usually practised.—The theoretical requirements for a complete scheme of drainage are, *first*, that there shall be an outflow from the infected tissues to the external surface or to the surface of a wound cavity; and, *secondly*, where a wound cavity exists, that there shall be drainage from that cavity to the exterior.

Drainage from the tissues.—In the customary treatment of wounds drainage from the tissues is not specially insisted upon—mere incision with or without fomentation being assumed to do in this respect what is necessary. In reality, however, in œdema only will sufficient drainage be given by this method. In tissues of normal density nothing like adequate effusion will be obtained, the lymph flow being here rapidly arrested by clotting and desiccation. And, where we are dealing with densely infiltrated tissues, incisions may fail to furnish even as much as a drop of exudation.

Drainage from the cavity of the wound.—Drainage-tubes, of course, do not induce any outflow of lymph from the tissues. They drain only from the cavity of the wound—outflow ceasing as soon as ever the well-head in the tissues dries up.

Summary of criticisms on the traditional method of treating wounds.—It has appeared above (*a*) that antiseptics do not exert any effective action in the wound either in the direction of extinguishing the infection or keeping down bacterial growth; (*b*) that the usual procedure of incising and inserting drainage-tubes provides, in place of that continuous welling out from the lymph spaces to the exterior which we require, a drainage which rapidly stanches at the source; and (*c*) that in the ordinary treatment of wounds no steps are taken to disperse infiltration; or accelerate the separation of the sloughs; or bring antibacterial lymph or phagocytes to the seat of infection.

In short, the treatment of wounds by a combination of antiseptics, incision, and mechanical drainage is a therapeutic method which constantly disappoints, because it fails to kill the infecting microbes and at the same time fails to give to the organism opportunity for ridding itself of the infection.

And lastly—and this point cannot be too much insisted upon—in the ordinary treatment of septic wounds not nearly enough care is taken to prevent those active and passive movements which lead to the mechanical impulsion of microbes along the lymphatics, and to *auto-inoculations*.

3. THE IDEAL OF PHYSIOLOGICAL TREATMENT IS TO GIVE INTELLIGENT AID TO THE ORGANISM IN COMBATING THE BACTERIAL INFECTION.

Saline dressings supply a means for evoking, in the infected wound, certain requisite physiological reactions. By their aid we can, while at the same time inhibiting bacterial growth, drain the tissues, resolve infiltration, and promote the separation of the sloughs—besides giving other assistance.

4. PHYSICAL AND PHYSIOLOGICAL ACTION OF CONCENTRATED SALT SOLUTIONS.

(1) A concentrated salt solution will attract water; and, except in the case where a membrane which is impermeable to albumen is interposed, the outflowing current of water will carry out with it the whole of the protein substances which it holds in solution. This means that hypertonic salt solution applied to tissues lying bare in the wound (or to granulating surfaces) will operate as a *lymphagogue* drawing out from the infected tissues lymph which has spent all its antibacterial energy, and drawing into the tissues from the blood stream lymph inimical to microbic growth.

(2) Brought into direct application upon leucocytes a hypertonic solution (what is in view here is a solution containing 5 per cent. salt) will disintegrate leucocytes, setting free the tryptic ferment they contain. Such a hypertonic salt solution will also exert a number of inhibitory actions.

(3) It will inhibit the action of the tryptic ferment set free in the wounds.

(4) It will inhibit coagulation and so prevent the sealing up of the orifices through which lymph pours into the wound.

(5) It will inhibit leucocytic emigration into, and prevent phagocytosis in the cavity of the wound.

(6) It will inhibit microbic growth.

5. PHYSICAL AND PHYSIOLOGICAL EFFECTS OF NORMAL (0·85 PER CENT.) SODIUM CHLORIDE SOLUTION.

Normal solutions of sodium chloride exercise—as many other substances also do—a positive chemotactic effect on white corpuscles. In other words, they will when applied to the surface of the wound bring leucocytes to the surface.

In moderately dilute solutions (solutions of 0·85 per cent. are here in view) salt does not interfere with the activity of trypsin, nor does it inhibit blood or lymph coagulation, phagocytosis or microbic growth.

6. THERAPEUTIC EMPLOYMENT OF HYPERTONIC SALINE SOLUTION IN THE EARLY STAGES OF THE INFECTED WOUND.

By the time the patient reaches the Casualty Clearing Station his wound will generally have assumed the characters of a lymph-bound, infiltrated, and sloughing wound; or it will be fast getting into this condition. And even though under care in hospital the wound may have been coming out from this condition, it will, on long journeys when redressing is difficult, be very prone to fall back into it (*vide infra, Subsection* 14).

The first requirement when we have an infected, lymph-bound, infiltrated, and sloughing wound will be—to get rid of the coating of scab and fibrin adhering to the surface of the wound, and set the lymph-flow going, to resolve the infiltration, and to promote the separation of the sloughs. This involves two successive operations. In the *first* we make use of the hypertonic solution undiluted; in the *second* we turn its dilution to profit.

Stage in which the Hypertonic Solution comes into Operation Undiluted.

The striking feature here will be the outpouring of lymph. But there will at the same time: (*a*) in the depth of the tissues, (*b*) on the surface, and (*c*) in the cavity of the wound be evoked other reactions which cannot be directly followed by the eye.

(*a*) *In the depth of the tissues* there will be substituted for the spent lymph which has been extracted lymph freshly drawn from the blood stream. This means that there will be substituted for a lymph which is favourable to the growth of all microbes indiscriminately a lymph which will stop the growth of *sero-saprophytic bacteria*, and *imperfect serophytes* (such as the gas-gangrene bacillus); and at the same time seriously impede the growth of serophytic bacteria, above all the growth of the streptococcus.[1]

Further, the microbes in the tissues, which when immersed in the spent lymph were insusceptible, will, immersed in the fresh lymph, become susceptible to phagocytosis. And in the induction of the phagocytosis in the interior of the tissues the imbibed salt will, we may take it, play a contributory rôle. For we have seen that salt, appropriately diluted, stimulates leucocytic emigration.

(*b*) *In the more superficial regions of the walls of the wound and adhering sloughs* the hypertonic salt solution will break down the leucocytes and set free tryptic ferment[2]—ferment which will, as we saw, not come into action so long as the concentration of the salt is maintained. The coagulation of the lymph on the face of the wound will also, as we saw, be inhibited by the hypertonic salt solution.

(*c*) *In the cavity of the wound* microbic growth will at the outset be completely arrested by the hypertonic salt, and it will, after the lymph has begun to pour out, be inhibited to different degrees according to circumstances by the combination of salt and antitryptic exudation. So long as the salt solution is maintained at full strength, both emigration into and phagocytosis in the cavity of the wound would be inhibited.

Sum-total of clinical effects produced by the undiluted hypertonic salt solution.—There will have been established, in the depth of the tissues, conditions favourable to the extermination of the microbic infection; and in the cavity of the wound conditions which will restrain microbic growth.

Stage in which the Dilution of the Hypertonic Salt Solution is Turned to Profit.

As soon as the hypertonic solution in the cavity of the wound has been sufficiently diluted by outflowing lymph, the salt diffuses out from the infiltrated walls of the wound and the sloughs; and with this the tryptic ferment previously set free in these comes into action, and goes about its work of *cleansing digestion*—resolving the products of inflammation in the infiltrated tissues, and severing the connecting strands by which the sloughs are bound to the face of the wound. At the same time, and this, be it noted, serves as a signal to the eye that the dilution of the salt solution has reached the point where all its inhibitory effects are abolished—leucocytes emigrate into the wound, and the discharge begins to assume a purulent character. Now also the bacteria begin to multiply in the cavity of the wound.

We cannot afford to let all this go on very long unchecked. For as more and more trypsin finds its way into the exudate, or is set free in it from leucocytes disintegrated by microbic poisons, the effusion comes to furnish a more and more congenial nutrient medium for microbes, and the check imposed by phagocytosis is more and more completely removed. Finally, the exudate becomes tryptic, and if the re-dressing of the wound is any longer delayed ground will now be rapidly lost (*vide infra, Subsection* 12—*Indications which call for the re-dressing of the wound*).

It will have to be remembered in connexion with this description that the conditions will in every wound be perpetually changing, and that these changes will not keep time in the different parts of a large wound.

7. UNDER CERTAIN SPECIAL CIRCUMSTANCES THE HYPERTONIC SALT SOLUTION SHOULD BE USED IN A DIFFERENT WAY.

Method in which hypertonic salt solution should be used when gas gangrene, streptococcic cellulitis, or other acute tissue infection supervenes, or where we are dealing with an infection of a joint.—Our whole concern here must be to draw out as rapidly and exhaustively as possible the corrupted lymph[3] which occupies the tissue spaces, replacing this with uncorrupted lymph drawn from the capillaries. To achieve this we must, after freely incising the tissues, or opening the infected joint, apply hypertonic salt solution and maintain this in full strength until we have got the upper hand of the infection.

Method in which the hypertonic salt solution should be used where we are threatened with secondary hæmorrhage.—Our aim and object here must be to prevent any digestive action in the neighbourhood of the endangered artery. Translated into practice, this means that we must apply hypertonic salt solution and maintain it at full strength so as to prevent any trypsin which may be liberated in the wound coming into action.

8. GENERAL INSTRUCTIONS FOR THE CARRYING OUT OF THE LINES OF TREATMENT INDICATED ABOVE.

Concentration in which the hypertonic salt solution ought to be brought into application.—For all ordinary purposes the best hypertonic solution to employ is a 5 per cent. solution of common salt. Where we require more vigorous lymphagogic effect we may resort to a 10 per cent. solution, or even to a stronger solution. But these are very painful when applied to skin edges and sensitive granulations; and salt applied in saturated or nearly saturated solutions will often cause sloughing of the superficial tissues (*vide Subsection* 10, *Footnote*).

Most convenient form of stock solution to keep on hand.—The most convenient stock solution to keep on hand is a saturated saline solution, made by shaking up water with an excess of salt and then allowing this to settle. Such a solution contains at ordinary temperatures 35 per cent. of salt.

Diluted 1 part saturated solution	with	6	parts	water	it gives a	5% solution.
,, 2 parts	,,	,,	5	,,	,,	10% ,,
,, 1 part	,,	,,	39	,,	,,	0·85% (physiological solution).

N.B.—Hot water should be employed for making the dilutions required for all saline dressings and irrigations. For the physiological reactions which are to be evoked, whether these be active hyperæmia and transudation, or tryptic digestion, or emigration and phagocytosis, are all impeded by cold and favoured by heat.

[1] The inhibition of microbic growth obtained with the serum of the patient with a large or even moderate-sized wound is much greater than that obtained with a normal serum. This, as comparative experiments have shown, is connected with the fact that the antitryptic power of the wounded man mounts up with very steep ascent (i.e., in the course of a couple of days), to a level three to eight times higher than the normal.

[2] The presence of trypsin in the wound can be very easily demonstrated. We need only collect a sample of pus or slough on a small swab of cotton wool; introduce this into milk containing ¼ per cent. of calcium chloride cryst. and then place this at a temperature of 50° to 55° C. (that is, in water just not too hot to hold one's hand in). If trypsin is present the milk will now rapidly clot. But it must be borne in mind in connexion with clotting obtained with a slough that, since under the conditions of the experiment we dilute our material, our test will give a positive result even when we have in the wound sufficient salt to prevent the ferment being actually operative.

[3] The lymph has ordinarily lost some, and in very severe infections it may have lost all, its antitryptic power. Further, in gas gangrene—and let me here interpolate that we have in gas gangrene, when fully developed, a profound acid intoxication—the lymph in the focus of infection often shows a much diminished alkalinity.

9. Method of Applying Hypertonic Salt Solution so that it may Produce an Adequate Lymphagogic Action, and afterwards Provide Opportunity for Digestive Cleansing of the Wound.

This will be the proper way of employing hypertonic salt solution in the infiltrated and sloughing wound. The following are the points to be borne in mind:—

(*a*) For the achievement of an adequate lymphagogic effect we must use quite considerable quantities of hypertonic solution. The dressings ought to come directly out of the hot solution and be applied dripping wet.

(*b*) In order that there may follow upon the lymphagogic action a cleansing digestion, the amount of salt employed must be kept within such limits as will allow of its being within a reasonable period diluted by the outflowing lymph. In other words, we must not use too much hypertonic salt solution, nor use too concentrated a solution; nor supplement with large packs of saturated salt solution or salt tabloids.[4]

In order to anticipate that pullulation of microbes which will supervene when the exudate becomes tryptic we ought to redress the wound as soon as the discharge begins to be purulent.

The procedure in carrying out these principles will, of course, vary according to the anatomical conditions of the wound. In point of fact, three different anatomical types of wound have to be considered: (*a*) The wound which from the beginning lay fully open or which has been opened up so as to render every portion of its surface fully accessible; (*b*) the wound where, owing to folds, or blind passages, or a tunnelled way, portions of the surface are not fully accessible; and (*c*) tubular wounds which are throughout their whole course more or less difficult of access.

(*a*) In the *first* case we have only to pack the wound with gauze thoroughly wetted in hot 5 per cent. salt solution. We cover this in with any impermeable tissue, such as jaconet. When the time comes for redressing the wound all trace of pus ought, before reapplying the saline, to be carefully removed. For pus treated with strong salt is converted into a sticky intractable substance which forms an impermeable coating on the walls of the wound.

(*b*) *Where the wound is pocketed or tends to flap together* the best procedure is to employ a bath of warm 5 per cent. saline. Should the position of the wound render immersion in a bath impracticable, it ought to be irrigated with warm 5 per cent. saline solution, the fluid being distributed over the whole surface of the wound by an arrangement of bandages.[5] The bath or irrigation ought to be discontinuous—intervals for digestive cleansing alternating with periods of lymphagogic and leucocyto-lytic action.

(*c*) Where we have a *tubular wound* it will, of course, be futile merely to insert a drainage-tube and cover its mouth with a piece of gauze wrung out of hypertonic salt solution. The rational procedure will here be to make windows in the tube, to cut it open longitudinally, and to lay into the hollow a folded strip of gauze, thoroughly wet with saturated salt solution. The tube thus armed is to be introduced into the wound after this has been syringed with 5 per cent. saline.[6]

10. Method of Applying Hypertonic Salt Solution where we want to Maintain its Strength undiminished so as to obtain its full Lymphagogic Effect and Suppress all Digestive Action.

It will be remembered that this is the way in which hypertonic salt solution should be used where we are threatened with secondary hæmorrhage; or are dealing with an infected joint; or with gas gangrene infection; or streptococcic cellulitis (*Vide supra, Subsection* 7). Let us consider how, using the ordinary hypertonic solution and the stock of solution of saturated salt, to effect our object in the three types of wound already referred to—the *completely* accessible, the *incompletely accessible*, and the *tunnel* wound.

(1) In the first variety of wound we, as before, pack with gauze thoroughly wet with 5 per cent. salt; but now reinforce by a backing of gauze thoroughly wet with saturated salt solution; and, as before, cover with some impermeable material. Or, as an alternative, we, at short intervals, renew the hypertonic solution, feeding this in with a syringe through a drainage-tube going down to the face of the wound.[7]

(2) In the case of the only *partially accessible wound* we resort as before to a bath of 5 per cent. saline or to irrigation with this solution, varying our procedure only in the respect that we make the bathing or irrigation continuous, or as nearly as possible continuous. When immersion in a bath and irrigation are both impracticable the wound ought to be dressed as in (1).

(3) In the case of the *tunnel wound*, we at short intervals renew the supply of salt: first withdrawing the old wick; then syringing out with 5 per cent. of salt; and then substituting for the old wick a new one taken fresh from saturated salt.

11. Nature of the External Covering to go over the Wet Salt Dressings.

The most usual practice is to place immediately outside the saline dressings a thick packing of dry cotton-wool, and again outside this a bandage. This seems to be dictated by the idea that the cotton-wool will soak up the discharges, and the notion that the capillarity of the cotton-wool and evaporation from its outer surface will reinforce the drawing action of the salt. In point of fact, however, all the cotton-wool does is to suck out some of the salt solution from the dressings and to evaporate this to dryness, putting in this way a certain quantum of salt out of action. Moreover, the notion that capillary action and evaporation would promote drainage from the tissues is in conflict with everyday experience, which shows that when we apply a dry dressing or let a wet dressing evaporate, the outflow of lymph from the wound ceases, and the dressing sticks to its surface.

The rational method of covering in saline dressings is to use, instead of cotton-wool, an impermeable covering.[8] Then instead of the salt solution being carried outwards by capillarity and evaporation, it will by diffusion be carried inward. The difficulty that with this form of dressing discharges will escape from under the impermeable covering can be met either by frequent re-dressing, or by placing cotton-wool outside the jaconet. In the case of wounds of the extremities, perhaps the simplest method of all is to dispense with all coverings over the salt dressings, merely renewing the salt packs at frequent intervals. But here,

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[4] In this connexion it will be well to emphasise that to fill into the wound cavity large numbers of salt tabloids must be pronounced wrong practice in the case where we judge the wound to be one which stands in need of digestive cleansing.

[5] See the Author's Memorandum on the Irrigation of Wounds, THE LANCET and Brit. Med. Jour., Oct. 16th, 1915.

[6] This procedure might at first sight seem open to objection (*a*) on the ground that saturated salt solution would here be brought into application upon the tissues; and (*b*) on the ground that to obstruct a drainage-tube by gauze would be to render it useless. In connexion with the former objection, it will suffice to point out that direct contact of the saturated salt solution with the tissues is avoided by the interposition of the wall of the tube; and that the salt in the wick will come into operation only through the medium of the weaker salt solution with which the wound has been syringed out. In connexion with the latter objection, consideration will show that it is only in ordinary *drainage ex vacuo*—i.e., it is only when we aim at keeping our wound cavity empty, and when we are dealing with viscid pus, and when unaided gravitation supplies in our scheme drainage out whole motive force—that it becomes incumbent to provide an unobstructed conduit to the exterior. In *drainage ex pleno*, such as is here proposed, we deal with a watery lymph effusion which wells over from the wound, and which only hermetical sealing could bank back.

[7] Another method which has been extensively practised is that of packing the wound with tabloids of salt, holding these off from actual contact with the tissues, by several folds of gauze. This would seem to give in different cases different results. In certain cases—such as when an open knee-joint is packed with tabloids of salt, disposed throughout the gauze with close and regular interspacing, the interior of the wound remains perfectly dry. The explanation would seem to be that the salt here comes into application in the form of a saturated solution all over the surface of the wound, condensing the tissues until they become impermeable to lymph; and at the same time pickling them in such a way, as, perhaps, to restrain all microbic growth in their interior. In other cases—for example, where a bagful of tabloids is introduced into the well of a large wound—there is obtained the ordinary lymphagogic effect. Here it would seem that the salt operates in form of a saturated solution upon the portion of the wound only lying nearest to the tabloids. And, hereabouts the tissues look and feel exactly like pickled meat. In regions more remote from the tabloids the salt will naturally be much less concentrated. And it is presumably from these regions that the copious lymph-outflow is derived.

[8] The prejudice against the use of impermeable coverings no doubt originates in the observation that discharges, when confined after they have become tryptic, will set to work and digest the surface of the wound. The proper remedy is not to discard the impermeable covering, but either to re-dress before the discharges become tryptic, or prevent them becoming tryptic.

if we want to clean off sloughs or resolve infiltration, we shall have to alternate with our dressings of hypertonic saline solution dressings of physiological saline solution.

12. INDICATIONS WHICH CALL FOR THE RE-DRESSING OF THE WOUND.

A septic wound requires to be re-dressed under two quite different conditions.

(*a*) It requires re-dressing as soon as tryptic ferment is set free in the cavity of the wound, such trypsin being set free from leucocytes broken down by microbic growth. For here, as soon as the originally antitryptic exudation becomes tryptic, all manner of sero-saprophytic microbes will multiply unrestricted and bacterial poisons may be absorbed, and at the same time phagocytosis will be inhibited, while the young tissue elements, which are the agents of repair, will be subjected to destructive digestion.

(*b*) Again, every septic wound ought to be re-dressed as soon as it becomes lymph-bound. For as soon as the exudation stanches, and lymph fresh from the blood ceases to come into application, the microbes in the tissues, being now no longer inhibited by their growth or phagocytosed, find congenial conditions and multiply.

It requires to be emphasised in connexion with these two indications for re-dressing that in the case of the septic wound intervention is much less urgently called for where we have *retention of corrupted discharges* than where the wound becomes *lymph-bound*. In the case of the *former* all we have to fear is a pullulation of microbes in the cavity of the wound, some absorption of septic products, and some injury of the tissues of repair. In connexion with a *lymph-bound wound* we may at any moment have a wide extension of the tissue infection, taking the form of gas gangrene or streptococcic cellulitis.

13. PRINCIPLE UPON WHICH CASES OUGHT TO BE CHOSEN FOR RE-DRESSING WHERE PREFERENCE MUST BE GIVEN TO THE MORE URGENT.

What has been said above on re-dressing ought to be specially kept in mind where it is impossible to inspect and re-dress every wound. In such cases the surgeon has, as a rule, simply pursued the practice followed in ordinary aseptic operation wounds. That is, he has, with a view to preventing the invasion of microbes from without, re-dressed the cases where the discharge has soaked through, giving to these preference over those with unsoiled dressings.

In septic wounds—for here the microbes are in the citadel and not outside the walls—we ought to follow an exactly opposite policy. Where the outside dressings are wet with discharge, in other words, when presumably lymph is being actively poured out, we may be confident that the wound is not coming to any harm. We may accordingly, when other work presses, quite properly postpone re-dressing such cases. The contrary will hold of a gravely wounded man whose dressings are unsoiled. In such a case it is always possible that we may underneath quite clean dressings have a lymph-bound wound. We ought without delay to satisfy ourselves with respect to this.

14. PRECAUTIONS TO BE TAKEN IN HANDLING THE WOUND TO PREVENT AUTO-INOCULATIONS AND A DISPERSAL OF SEPTIC INFECTION ALONG THE LYMPHATIC CHANNELS.

Like the acutely sick, all the wounded are suffering from a bacterial infection. And the same general therapeutical principles apply. So long as microbes in large number are harboured in the tissues we have pyrexia. And the patient's condition will be aggravated by all dispersion of the infection and absorption of bacterial poisons into the blood. So that in every case the infected man will need to be kept at rest, and the really heavily infected will require to be kept at *absolute rest*. This requirement is, of course, in the case of those suffering from infected compound fractures more or less perfectly complied with by the application of apparatus for fixing the limb. But not only wounds complicated by fracture, but all wounds with the infected tissues in their neighbourhood ought so far as possible to be immobilised. Moreover, this ought to be begun immediately after the wound has been inflicted, and to be continued so long as appreciable infection persists in the depth of the tissues. In connexion with operative procedures it is, of course, impracticable to conform completely to this requirement. But none the less the requirement should never be lost sight of. It is scientifically reprehensible to cast loose, as is so often done under an anæsthetic, a fractured limb from all splints, deliver it over to an orderly for energetic washing and disinfection, and permit the foot or hand below the fracture to be used as a handle for raising or turning over the limb. All the necessary passive movements ought to be reduced to an absolute minimum. And the light hand of the skilful surgeon will, in operating on an infected case, be a very valuable asset. In the same way, seeing that very efficient apparatus has now been devised, fractured limbs ought no longer to be put up in such a way as to allow of sagging or displacement during re-dressing. Again, in changing the dressings on large flesh wounds on an arm or leg, great care ought to be taken not to manipulate, or flex or extend, or unnecessarily disturb the position of the limb.

It is difficult to doubt that when these precautions are neglected bacteria from the infected area will be propelled along the lymphatic channels in the direction of the heart. And measurements of the opsonic power of the blood and, indeed, simple inspection of the charts establish that all readjustments of the position of a fractured limb, and probably all re-dressing of large wounds, are followed by elevations of temperature corresponding to very serious auto-inoculations. The same will, of course, apply to shocks and jolts received when the infected patient is being carried from the ward to the operation theatre, or is being transported by train or motor.

15. MANNER IN WHICH WOUNDS SHOULD BE DRESSED IN PREPARATION FOR LONG JOURNEYS DURING WHICH THEY CANNOT BE KEPT UNDER CLOSE OBSERVATION.

What has been said in the preceding subsections has an important bearing upon the procedure to safeguard the patient against that delay in re-dressing which is inevitable during the long hours which will be consumed in travelling from the front to the base, or from the base to England, and in settling down into a new hospital. The danger from microbic pullulation in the cavity of the wound and tryptic digestion, and, on the other hand, the much graver danger of a tissue infection taking origin in a lymph-bound wound, have here to be provided against. This means that we have to arrange for a continuous outflow of lymph, and at the same time to arrange for the surface of the wound being kept thoroughly wet. The proper course will be to dress the wound as indicated in *Subsections* 10 *and* 11, *supra*, applying outside the impermeable covering dry cotton-wool. Thus treated the patient may arrive at his destination with soaked dressings; but he is not likely to arrive with corrupted pus; and we can be practically certain that he will not arrive with a tissue infection spreading from a lymph-bound wound.

16. METHOD OF CORRECTING CERTAIN UNDESIRABLE AFTER-EFFECTS WHICH MAY SUPERVENE UPON THE ILL-CONSIDERED, OR TOO LONG CONTINUED, USE OF HYPERTONIC SALT SOLUTIONS; AND INDICATIONS AS TO WHEN THE HYPERTONIC SALT SOLUTION OUGHT TO BE DISCARDED IN FAVOUR OF A WEAKER SOLUTION.

The rationale of the therapeutic employment of hypertonic solutions is, as we have seen, to be found in the fact that (1) they drain the tissues; (2) break down the leucocytes in sloughs, and in the walls of the wound, and so give us, quite apart from any destruction of leucocytes by microbic agency, the trypsin we require for the digestive cleansing of the wound; (3) they produce active hyperæmia; (4) prevent clotting of the lymph in the walls of the wound; (5) suspend the action of the tryptic ferment set free from the leucocytes; and (6) inhibit bacterial growth—the inhibitory actions last in question being exerted only so long as the strength of the salt solution is maintained. In addition—but this counts, of course, as a disadvantage and not as a therapeutical asset—hypertonic solutions repel leucocytes and prevent phagocytosis.

If we want, in employing hypertonic salt solution, to turn its therapeutical qualities to best advantage, we must be continually on the watch to anticipate and correct any of the defects of its qualities.

(1) Where blood continues to ooze from an operation stump or wound which has been packed with hypertonic salt solution, this will be due to this anti-coagulative agent having been applied before bleeding has stopped. The proper procedure will always be to postpone the use of hypertonic salt until all oozing of blood has ceased. Applied then, the salt will not resolve the blood clot; and where the

hypertonic solution applied is a 5 per cent. solution, a very little dilution will bring it to the point when blood clotting will no longer be inhibited.

(2) When the face of the wound is found covered with a firmly adherent glutinous coating, this has been derived from leucocytes broken down by the direct application of strong salt. The way of avoiding this obstacle—it is, as a matter of fact, a serious obstacle to effective draining and irrigation—is to clean out all pus from the wound before bringing the hypertonic salt solution into application.

(3) Where, as very rarely happens, the granulations become œdematous this will be due to the over-prolonged application of concentrated salt solutions. It would seem that here the salt which is imbibed into the granulations is not sufficiently promptly carried off by the circulation, with the result that fluid is drawn into the salt-impregnated tissues, both from the underlying strata, and also (when their salt content diminishes) from the discharges. The remedy will be to discontinue the application of salt, and to apply hot fomentations in order to activate the circulation and promote absorption.

(4) Where the granulations assume a bright coral-red colour, and bleed at the least touch, it will be well to reduce the concentration of the salt solution—in the case where drainage of the tissues is still required to 2·5 per cent., and in the case where no further lymphagogic effect is required to 0·85 per cent.

(5) Quite apart from the development of any undesirable secondary effects, it will be well as soon as every trace of induration has disappeared, and all sloughs have been got rid of, to substitute for the hypertonic a physiological salt solution. The rationale of this is, that there will here still remain on the face of the wound, even though it looks to the naked eye perfectly clean, serophytic microbes, which, though quite at home in the serum, can be killed by phagocytosis. In order to kill these—and let us note that they are not killed but only inhibited in their growth by hypertonic salt solution—we must bring leucocytes to the surface of the wound.

17. THERAPEUTIC APPLICATION OF PHYSIOLOGICAL SALT SOLUTION.

What remains to be done is (*a*) to destroy the serophytic bacteria—streptococci and staphylococci—which still survive upon the face of the wound; and (*b*) to reduce the extent of surface lying open to infection, holding before ourselves always as an ideal the closure of the wound by secondary suture.

Destruction of the serophytic microbes remaining on the face of the wound.—A surface infection such as we have still to deal with can be effectively combated by keeping the wound wet with physiological salt solution and re-dressing at short intervals. The application of physiological salt solution will, as we have seen, promote the emigration of phagocytes, the frequent re-dressing will prevent the setback that will occur every time that leucocytes die off and set free their trypsin in the wound; and the combination of the two will, in the case where the deeper tissues have been freed from infection, either exterminate the surface infection, or at any rate so nearly exterminate it as to make it safe to embark upon an operation for the closure of the wound.

18. FINAL STAGES IN THE TREATMENT OF THE WOUND.

Conditions under which wounds may be closed by secondary suture.—Secondary suture may be safely embarked upon when we have favourable bacteriological conditions in combination with favourable anatomical conditions.

The bacteriological conditions may be pronounced favourable when (*a*) microscopic examination of fluid from the depth drawn out by a "lymph leech"; or failing this, clinical evidence points to the probability of our having got rid of all the deep infection, and when (*b*) stained impression preparations made from the wound surface show that we have there large numbers of perfectly well conditioned polynuclear leucocytes, and a complete absence of microbes, or only here and there a stray microbe.

The anatomical conditions are favourable when we can, with or without undercutting, bring together the skin edges without putting too great a strain upon the sutures, or leaving underneath any hollow spaces. The operation of secondary suture may be undertaken either before the wound surfaces are covered in with granulations, or subsequent to this—the former of these dates being, from the bacteriological point of view, the more favourable, in the respect that there will be less risk of infection lurking below the surface.

It will, in every case, be advisable—for the conditions may change within the lapse of a few hours—to let the operation follow immediately upon the examination of the impression preparations.

In connexion with secondary suture, as in every other case where a wound is sewn up without adequate guarantee for its asepticity, it will always be imperative to keep the patient under the anxious observation of the operator for at least a week afterwards.

Procedure where the wound cannot be closed by secondary suture.—When the anatomical conditions do not allow of the wound being closed by secondary suture, we must fall back on the policy of persistently combating the surface infection, consolidating the granulations, and encouraging the covering in of these by epithelium. In the present state of our knowledge, perhaps the best we can do will be to employ dressings of physiological salt or, better, of Ringer's solution (for this contains a large assortment of physiological useful salts), re-dressing the wound frequently. Where we are dealing with a large defect of skin, grafting may usefully be resorted to.

A CONTRIBUTION TO THE ETIOLOGY OF SHELL SHOCK.[1]

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THE functional nervous affections of modern warfare are essentially the same as the functional nervous affections of civil life, and in consequence should be of great value in helping to elucidate problems connected with the etiology of functional nervous disease in general. For instance, while we must admit that, up to the present, more has been done to deny than to disprove the universal application of the "sex" theory by Freud and his followers, it is obvious that these cases of so-called "shell shock" should be invaluable for the latter purpose. At the present time, however, the etiology of "shell shock" is buried in confusion, owing to three main difficulties, namely:—

1. *Bad terminology.*—As pointed out by Dr. Henry Head[2] the term "shell shock" has been used indiscriminately to include all functional nerve cases, whether due to shell explosions or not, and also not a few cases of organic nature. By force of use in civil life the terms "neurasthenia," "psychasthenia," and "hysteria," have become narrowed and fixed, and do not meet our needs in classifying cases which commonly exhibit elements of all three of these conditions.

2. *Dubious clinical histories.*—To obtain an exact and reliable history of the causative events in a case of shell shock is usually difficult and frequently impossible. Apart from the possibility of temporary true concussion, we have to contend with amnesias of various grades and durations, and also with the distorting mechanisms of rationalisation and repression by the patient.

3. *Rapid changes in clinical condition.*—In shell shock changes in clinical condition may occur with such startling rapidity that the medical officer at the front and the medical officer at the base or at home may see the same patient in conditions so dissimilar that they are compelled to different conclusions. (It is very exceptional for any clinical notes to accompany these cases from the front.)

For a period of six months, while attached to No. 12 General Hospital, I was responsible for the diagnosis and subsequent destination of all the functional nervous cases which passed through one of our medical bases in France. Though unable to watch the subsequent progress of these cases, I had the advantage of seeing them at an earlier stage than observers at home, and in doing this work became much impressed by two facts—namely, (*a*) that the condition

[1] The term "shell shock" is used unwillingly in this paper in order to avoid multiplication of names; but this use is limited to cases of functional nervous disease resulting from fighting at the front, all organic cases, mental deficients, simple chronic epileptics, &c., being excluded.

[2] THE LANCET, Feb. 5th, 1916, p. 306.

of shell shock was of extraordinary rarity amongst the wounded; and (*b*) that the vast majority of these cases, if not all, were due to psychic shock, and not to physical shock.

In view of the confusion now existing, it seems worth while to consider the possible etiological factors of these cases, arranging them under the following headings:—1. Wounds. 2. Possible physical causes: (*a*) physical exhaustion from exposure and hardship; (*b*) physical concussion. 3. Possible chemical causes: Absorption of toxic gases generated in shell explosions. 4. Possible psychic causes: (*a*) Gradual psychic exhaustion (1) as a predisposing cause, and (2) as a cause of neurosis *per se*; (*b*) Sudden psychic shock from (1) horrible sights, (2) losses, (3) being near an explosion, and (4) sounds. 5. Causes of relapse. This list is arranged in the above order for convenience of discussion, wounds being placed first because they are of outstanding importance in a negative respect. The theory of gas liberation in the blood advanced by M. Arnoux has been commented on by Surgeon-General W. F. Stevenson[3] and need not be considered here.

1. *Wounds and Shell Shock.*

In the 12 months during which I was attached to general hospitals in France many thousands of wounded, the majority being the subjects of shell wounds, passed through the surgical divisions of these hospitals; yet I cannot now recall to mind a single instance in which I was called in to see a condition of shell shock complicating a wound. In fact, shell shock was not to be seen in the surgical wards. Mr. Beckwith Whitehouse confirms this observation in a letter as follows: "From my experience of 12 months' surgery at No. 8 General Hospital I should say that functional neuroses are amongst the rarest of the conditions found in the surgical cases admitted to a base hospital. 'Shell shock,' as exemplified by monoplegias, paraplegias, mutism, somnambulism, fits, hysterical tics, and neurasthenia, is conspicuous by its absence. Amongst the large number of pure shell wounds I cannot recall a single instance of shell shock."

The cheerfulness of our wounded is an established fact, absent only in the presence of surgical shock or severe septic intoxication, and though some may show a slight degree of nervous exhaustion this is usually of late development, manifesting itself when the wound condition is such that a return to the front becomes a factor to be reckoned with. Out of 150 of my cases 14 had been wounded, but in all of these the wound was trivial; in two the wound actually followed the onset of nervous symptoms, and in four the wounds were completely healed before the onset of symptoms. Consequently, not only may it be said that in no single case did a wound merit consideration as a physical cause of shell shock, but, further, that the wounded appear to be comparatively immune to shell shock. In view of the fact that the wounded must have been exposed to the physical and chemical effects of shell explosions to a greater degree than the unwounded, this fact is most significant.

2. *Possible Physical Causes.*

(*a*) *Exposure and hardship.*—We might presume that these would gradually exhaust physical and psychic tone, and so lessen psychic resistance; but our troops in France are very well fed and are free from epidemic infections, and under these circumstances moderate cold and exposure tend to improve rather than to diminish physical well-being. Of 142 cases in which histories could be obtained only three offered exposure and hardship as the cause of their nervous condition. One, a man who gave a family and personal history of "fits," had been punished for purposely injuring his trigger finger the second day he was in the trenches. The other two gave neuropathic family histories and were of obvious neuropathic nature themselves. In other words, these three were all "terror" cases occurring in neuropathic individuals, and their complaint of exposure as the cause of their condition may be discounted as unconscious rationalisation, or even, perhaps, conscious untruth.

I have no observations in connexion with troops exhausted by marching, but in respect of trench warfare, when the troops are well fed, exposure and hardship do not dispose to nervous breakdown.

[3] Note on the Causes of Death due to High Explosive Shells in Unwounded Men, Brit. Med. Jour., Sept. 18th, 1915, p. 450.

(*b*) *Physical concussion.*—This may be produced by alterations in atmospheric pressure resulting from a shell explosion,[4] by blows from sandbags, beams of wood, or earth when buried, or by a combination of these forces. If true concussion were a common cause of shell shock it would not be unreasonable to expect (*a*) that shell shock would occur among the wounded at least as frequently as among the unwounded; (*b*) that the neurosis caused by concussion would follow a broad type, with which we should by now have become acquainted, rather than copy every known type of functional nervous disease; (*c*) that the concussion should be severe enough to cause unconsciousness at the time it occurred. The absence of shell shock among the wounded has been dealt with above, and in spite of 18 months' study of these cases we cannot indicate any type of neurosis, constant even within wide limits, as caused by physical concussion, so that expectations (*a*) and (*b*) are immediately negatived. With regard to expectation (*c*) difficulty is caused by dubious clinical histories, but in this connexion I think that the general tendency is for these patients to exaggerate the degree and duration of unconsciousness. Investigation of 142 cases of shell shock shows that 52 of them may have been exposed to the physical effects of explosion, these men having been near a bursting shell, or knocked over or buried thereby. Since in most cases the men were in the trenches, and the shells exploded outside, they would have been out of the direct line of air pressure. In 9 of these cases the question of true unconsciousness remains doubtful, 10 probably were rendered really unconscious, generally as the result of a blow from a sandbag or beam, but 33 did not lose consciousness at all. This shows that true concussion was neither frequent nor severe in these cases.

Further investigation of this group show that in 8 the subsequent neurosis was almost certainly due to psychic shock; 7 were certainly partly psychic in causation; 6 did not develop symptoms until late (one man had no symptoms for three weeks after the explosion incident); 3 had had similar attacks before, in civil life; in 1 the neurosis antedated the explosion incident; in 1 similar symptoms recurred from the psychic stimulus of having to go to the front again; and 10 developed types of neurosis which, in my opinion, are most unlikely to have been caused by simple physical concussion, namely, 2 hysterical tics, 2 typical hysterical monoplegias, 5 deaf-mutes, and 1 hysterical somnambulism. Cases 38 and 101 are examples of those in which the psychic trauma appears to me to be more important than the physical trauma. In both unconsciousness was momentary at most, so that physical trauma must have been slight.

CASE 38.—Lieutenant ——, aged 24. The patient came out at the start of the war and went through Mons and Le Cateau. On the Aisne an 11-inch shell landed in his trench—"One man was simply blown away, and four others were done for." The patient was "knocked out" for some seconds only. After this incident he started sitting up in his dug-out night and day, thinking of high-explosive shells, and gradually getting exhausted and depressed. After about three weeks of this he was sent home, and he remained in a more or less neurasthenic condition until sent out to France again in February, 1915, staying at a base camp until seen in March. When seen he was still in a neurasthenic condition and complained that he was still dreaming about the shell incident, "seeing the man blown up—and the trench, as it was, like a butcher's shop."

CASE 101.—Sergeant ——, infantry, aged 28. Past and family histories negative. The patient had been nine months at the front, and had been through Mons, &c., but he kept quite well until about three weeks ago. "Twenty-three days ago I was issuing rations when they got the range of us—and killed the other chaps. I got blown away and knocked over. I saw everything—fellows in pieces. Then a second shell came. I got lifted and knocked about 10 yards." The patient started shaking after this, and felt "all to pieces," but carried on his duty. Two days later "shells dropped on the dug-outs and killed the other chaps. I have not slept properly since this. If I go to sleep, I wake up seeing people killed, shells dropping, and all kinds of horrid dreams, all about war." Usually in these dreams patient saw the above men again, and awoke with a start and shaking. One or two of these men had been "pals." General asthenia and mental depression were marked, and he suffered from attacks in which he "burst out blubbing

[4] F. W. Mott: The Effects of High Explosives upon the Central Nervous System, THE LANCET, Feb. 12th, 1916, p. 331.

like a child." Over a fortnight after the first incident, while he was in a base hospital, "head-shaking" commenced. On examination the patient was found to be in a state of nerve tension, jumping at the least sound. He had spasmodic tic movements, causing extension of the head with protrusion of the lower jaw and contraction of the occipito-frontalis muscle. At times the muscles of the left shoulder-girdle were similarly affected. Slight fine tremor was present in the hands and eyelids, and there was difficulty in keeping the eyes fixed on an object. Sight and hearing were normal and his intelligence above normal.

To sum up these 52 cases which had possibly been exposed to the physical effects of explosion, there are only 5 (3·5 per cent. of all cases of shell shock) in which the evidence, being negative in other respects, favours physical concussion as the cause of the subsequent neurosis. Even in these it is possible that psychic shock preceded loss of consciousness or that true loss of consciousness never occurred. (See Cases 25 and 141.) We may conclude that physical concussion occurs in but a few cases of shell shock; in these it is not severe in degree, and plays but a small part in the production of symptoms, being comparable to, and in most cases of no more importance than, the minor injury in cases of traumatic hysteria of civil life.

3. *Possible Chemical Causes.*

Absorption of toxic gases generated by shell explosions.—Mott[5] has discussed the possibility of carbon monoxide poisoning and the effects which it may produce on the nervous system. In an individual case it is impossible to estimate whether such poisoning has taken place or not, because no clinical notes are brought from the front; but the fact that the wounded do not suffer from "shell shock" proves that gas poisoning cannot be more than a very rare and exceptional cause of this condition. Only three of my series of patients (2·1 per cent.) complained that they had been poisoned by "shell gas." There was no evidence to indicate the nature of the gas or that carbon monoxide was present, and it is noteworthy that the elements of psychic terror and very slight physical injury were present in each case.

CASE 68.—Rifleman ——, aged 24. Past and family histories negative. The patient had been in the firing line for six months and had kept quite well, having no nerve trouble until Hill 60. His regiment was going up the hill at night, to relieve those holding it, when it came under heavy fire from "gas shells, like mustard and cress." The patient, being in the reserve company, was in a dug-out for a short time, but later started up the hill again under heavy shell fire. On the way up, six shells pitched near together, and he was knocked over and half buried in dust and débris. He was "gassed and dazed," but not "stunned." He got into a dug-out and then could not control himself, lying down with shaking all over which he could not stop. Slight shaking had persisted ever since. He suffered from headache for the first 48 hours only after the above. He complained of feeling depressed and that his sleep was spoiled by "awful dreams, practically always the same, of Hill 60. I can see it all, where we lost 30 or 40 men; they screamed and moaned, some with their arms blown off." The patient had not reported sick, but had been sent sick because of the tremor. On examination there were marked general depression and asthenia, and fine tremor of the hands. The knee-jerks were increased. Sensation was normal, and intelligence above normal.

CASE 107.—Private ——, infantry, aged 20. No past and family histories of nervous nature remembered, but memory not good. The patient was quite mute, but understood questions and replied in writing. He had been at the front for three months, keeping quite well until 10 days ago, when "shells bursting near me and gas got into my lungs and made breathing very painful. One piece of shell, or stone, struck me in the side, and I did not remember any more until I found myself in the dressing station." Since this he had been quite mute, depressed, miserable, and had suffered from constant frontal headache. His sleep was poor owing to dreams. "I dream about as if there was always someone trying to shoot at me, and always shells bursting near me, and it seems as if I cannot escape from that gas." On examination there was fine tremor of the hands and the patient was quite mute. Hearing, intelligence, and writing power were quite normal. When asked a question he wrinkled his forehead and appeared to think hard, but the lips and tongue remained unmoved, no attempt to articulate being made. Sensation and the reflexes were normal, and no contraction of the visual fields could be demonstrated by rough testing. Some tenderness was present over the eighth rib on the right side, about the posterior axillary line, the spot on which he had been struck, but there was no bruising or other sign of injury, and the lung and pleura were normal, so that the blow cannot have been severe.

CASE 121.—Private ——, infantry, aged 27. Past and family histories negative. The patient had been at the front for three months. A month ago he was slightly wounded, but the wound had healed and he had returned to the front. He was quite mute, but intelligent, communicating the following in writing: "We were on our way to the trenches, and as we were going through the railway cutting they started to shell us, with gas shells mostly, and we had not been there more than a quarter of an hour when I was compelled to lie down through temporary blindness and weakness through getting a dose of gas through my mouth and eyes. I was lying down for about ten minutes when a shell came somewhere near, and was struck by something in the face and on my left knee, and I remembered no more until I found myself in hospital. I was all of a shake, and while lying down would frequently jump up and wonder where I was." The patient had been quite mute and rather depressed since the above incident. He dreamed occasionally, always about fighting and bursting shells, but not in connexion with any particular incident. Fine tremor, present in the hands, could be controlled by will, but was apt to be worse in the quiet of the night. The knee-jerks were markedly increased. There was difficulty in fixing the eyes on lateral deviation. Slight deafness in the left ear was accounted for by chronic discharging otitis media, with an old perforation of the membrane. All other signs were negative, there being no evidence of injury on the face or knee.

The psychic stimulus of terror was present in all three of these cases, reinforced in Case 68 by horrible sights. Cases 107 and 121 both lapsed into prolonged unconsciousness immediately on receiving blows of such trivial nature that they caused no signs of physical injury and in such positions that concussion would be unlikely to ensue. The coincidence of loss of consciousness with the moment of injury and the fact that it was sudden render it highly improbable that it was due to gas poisoning. It is fair to infer that these men were in a condition of psychic tension in which they could have been knocked down by the proverbial feather, and that the effect of the blows was psychic rather than physical.

A consideration of the psychic causation of these cases, in conjunction with the absence of shell shock from amongst the wounded, compels us to the conclusion that chemical poisoning by shell gas cannot be more than an exceptional cause of "shell shock."

4. *Possible Psychic Causes.*

(*a*) *Gradual psychic exhaustion from continued psychic strain.*—(1) As a predisposing cause. The degree to which continued psychic strain will predispose to shell shock is most difficult to estimate. Most of my patients claimed that they had kept perfectly well up to the time of the causative incident, but some admitted that they had felt the strain on their nerves. Definite statements concerning family and past histories were obtained from 129 patients. Of 78 who denied having felt the gradual strain 46 were free from all neuropathic taint, whereas of 51 who confessed they had felt the strain only 8 were free from this taint. It is certain that continued psychic strain is much more potent as a disposing cause in those of neuropathic predisposition, and I think that it must also have exerted a similar influence in a large number of those who were unconscious of its action.

(2) As a cause of neurosis *per se*. In a few cases the "shell shock" had been gradual in onset and, as far as could be ascertained, due solely to the continued psychic strain of the anticipation, or presence, of danger. Two patients broke down immediately on reaching the trenches, though neither of them had actually come in contact with danger. One confessed to a previous nerve collapse in civil life, and that he had begun to feel "queer" on the journey to France; the other had always been "timid," and he collapsed at once from the sound of the guns. These are simple examples of anticipatory terror acting on neuropathic men.

Of 13 men in whom the continued psychic strain of trench life appeared to be the sole cause of breakdown only 2 were free from neuropathic predisposition. Four gave both personal and family histories of functional nervous trouble, 5 gave positive family histories only, and 2 positive personal histories. The two men who were free from neuropathic taint had stood trench life for eight and six months respectively, whereas the "sticking period" for the neuropathic cases averaged two and a half months, the longest

[5] Op. cit., Feb. 26th, 1916, p. 441.

being five months. In all these continued psychic strain cases the resultant neurosis was of asthenic type. Weakness, loss of energy, mental depression, and poor sleeping were prominent symptoms. Some were apprehensive and fearful, and most showed fine tremor and increase of knee-jerks.

This group of cases shows that continued psychic strain is not likely to produce a nervous breakdown *per se*, except in the case of individuals of neuropathic predisposition. In the resulting type of neurosis, the group also forms an interesting contrast with another group of six cases in which, although the nervous condition was gradual in development, it appeared to be caused by a special incident. In this latter group neuropathic predisposition was much less common, and the resultant nervous affection was of hysteric rather than asthenic type. Most of these patients showed marked tremor, 1 suffered from waking hypnoidal states, 1 from hysterical somnambulism, 1 from hysterical paraplegia, and 1 from hysterical hallucinations of smell leading to hysterical vomiting. The last case is worth recording as the only one in which a symptom connected with the sense of smell occurred, and also as an example of the manner in which the story of psychic strain is partly repressed by the patient.

CASE 146.—Lieutenant ——, infantry. Past history negative. Family history nil, except mother of nervous disposition. After the patient had been at the front for three and a half months he started vomiting everything he took. This vomiting resisted treatment at the front, and a fortnight later he was transferred to a base hospital as a case of gastritis. There was no gastric pain, except such as occurred with the strain of vomiting, and physical examination of the alimentary system was negative. In the course of examination he also complained of his nerves, the latter taking the form of sleeping badly owing to dreams "about trench life at the front, of coming across something awful and burying it, of burying dead." He used to wake suddenly from these dreams, sweating freely. It was obvious that these dreams were important because the patient was manifestly unwilling to refer to them, and became emotional on doing so. Further questioning elicited the fact that he had been very much upset by having to supervise the burial of a large number of decomposing bodies, and that after this incident he had been haunted by, and unable to escape from, "that awful smell of the dead." He had developed waking states of mental abstraction in which he kept going over the burying experience again and again; he had lost the power to concentrate his attention on anything else, and suffered from emotional attacks of crying when by himself. Finally it was evident, and the patient himself admitted, that the vomiting was simply secondary to the hysterical hallucination of smell.

We may conclude that gradual psychic exhaustion from continued psychic strain is an important causative factor in cases of shell shock, particularly in individuals of neuropathic predisposition. In these it may suffice *per se*, the resultant neuroses being of asthenic type. Cases of gradual development caused by a special incident differ in the fact that the resultant neurosis is usually of hysteric type.

(*b*) *Sudden psychic shock.*—In most cases of shell shock the immediate cause of the nerve collapse is to be found in some sudden psychic shock. The various events which may produce such sudden shock are (1) horrible sights, (2) losses, (3) fright from an explosion, or (4) sounds. From the nature of the case it commonly happens that two or three of these factors are combined in the production of psychic shock, making it difficult to apportion the measure of blame due to each; but I think that anyone who has questioned a large number of these patients must have become deeply impressed by the critical influence exerted by horrible sights.

(1) *Horrible sights.*—While the histories of 142 patients reveal that horrible sights formed a definite causative factor in 51 cases, and a probable factor in 13 more, it is certain that these figures are far below the true mark, owing to the remarkable repression of memory which takes place in connexion with sights. In some instances sights are completely obliterated from conscious memory (see Cases 25 and 141), and in others this obliteration is partial, the patient striving to keep the sight memories from re-entering his own consciousness and reaching that of his questioner. (Memory in dreams only, unwillingness to talk about these incidents, with emotion on doing so, &c.—Case 126.) I became convinced that the more a memory was repressed the greater was its significance in respect of the cause of the nervous condition, and, as far as I could ascertain, this repressive tendency was mainly concerned with memory for sights, from which, indeed, it was rarely altogether absent. Almost without exception men confess that they hate and fear shell fire, and I think that the self-control which enables them to endure it is largely due to the fact that full realisation of its horrible possibilities is not acute or clear in their minds. This deficiency of realisation may be partly conscious, a refusal to think, and partly unconscious, a negative gift of nature. Throughout life nature disarms our most trying moments by withholding acuity of realisation, and thus preventing psychic strain from attaining sufficient strength to break our nervous resistance. It may be that horrible sights are potent to cause shell shock because they convert a poorly imagined blurred picture, into a real picture acutely focussed, a half realisation into a full realisation, the latter being too powerful for nerve resistance to withstand. Cases 25 and 141 are examples of complete obliteration of sight memories, in which, however, the memory of the explosion is retained.

CASE 25.—Private ——, R.A.M.C., aged 19. Notes from field ambulance: "Private —— was close to a shell which burst among a company standing in the road, killing 20 and wounding 20 others. He worked well in assisting the wounded, and then proceeded to clear up the fragments of the killed. Whilst doing this he suddenly lost his mental balance, and has been in his present state nearly 24 hours. He has been given bromides." Notes by another medical officer attached to the same field ambulance: "This man is suffering from mental shock caused by having to clear away the remains of a number of men killed by a shell. He does not recognise his friends, and at frequent intervals has periods of terror, exclaiming 'Cover it up.' He is sleepless (without drugs). He takes food badly. He is possibly suicidal, or may become so." The patient's own story was that he had been at the front for four months and had kept quite well. After a day or two of heavy work under shell fire he remembered being on the La Bassée road with the troops. "And I remember the crash of some shot and a shell burst, I think, and I can't remember anything more until I woke in the morning in the train. [This must have been at least 48 hours later.] I can only remember the noise and I think men calling out." The patient's intelligence and his memory for all events previous to the above were excellent. On admission to base hospital the same day that he "woke" in the train he complained of feeling "swimmy in the head, as if expecting something, something seems to be coming, as if something going to happen, something nasty, when I hear anything like the whistle of a shell coming towards me." There was no tremor; in fact, physical examination of the nervous system was negative in every respect.

The above case is an example of complete amnesia dating from the moment of explosion. It illustrates the immense value of a note from the medical officer at the front. Without such a note the case would have been included with those which, failing other evidence, have been put down as possibly due to physical concussion.

CASE 141.—Sapper ——, R.E., aged 25. The patient was admitted to a base hospital in a semi-stuporose state. He would not answer questions and mistook the identity of those around him. He slept most of the first day in hospital. The next day he was a little better, recognising to some extent that he was in hospital and that the orderlies and patients were not his old friends. He complained that his mind was "all of a blur." He did not remember coming to France, saying "it all seems a mist." He wandered from one subject to another but recognised that he was ill, was afraid of becoming insane, and wished to be better. There was some coarse tremor of the hands, but all other physical signs were negative. Later the same day he complained of not sleeping and not knowing whether he was dreaming. At intervals over a period of about half an hour, helped by questions, he ejaculated the following with much emotion—"Joe, don't go—Give me my rifle—Joe—Ten killed—Poor old Taffy—Dreamt last night—Saw Harry Edmunds with all his ribs broken—When we had the explosion—5000 bombs, or two and a half tons of explosives, blew up—Joe—Clay said he'd never live three weeks—Glasses blown in—Taffy killed by shell in stomach—S—— L—— all privates blown off him—Just after leaving workshop." At times, between the above statements, patient went into short trance states, staring and pointing out of the tent, being impervious to questions and difficult to bring round. It was evident that he had been in an explosion incident in which many of his friends had been killed and mutilated, but in which he himself had escaped physical injury, remaining all too conscious of what was taking place. The next morning I found him in a condition of cheerful emotion, saying that he was ever so much better and that the orderly had "saved" him. It appeared that the orderly had taken him to the Y.M.C.A. recreation tent, played the piano to him, and made him play himself, whereupon his

whole conscious field had suddenly changed over, the patient becoming an intelligent, cheerful, but emotional man, with good memory for everything previous to his reaching France, and memory of the simple fact of an explosion, but nothing more. On taking him through the names mentioned above he remembered them all, saying that the men had been in his company. He did not remember anything connected with them in France. When asked where these men were he said that he did not know, but he was not in the least anxious or bothered about them.

This case is not unlike Case 25, showing almost complete dissociation of consciousness. In the first phase after the explosion almost everything was obliterated from memory except the losses and sights connected with it. In the second phase everything that had occurred after arrival in France was obliterated except the solitary fact that an explosion had taken place. The case would have been included as a possible physical concussion case by anyone who had not seen or received notes about the patient in the first phase.

An example of partial repression of memory for sights is seen in Case 68 quoted above, and the following case is of similar nature.

CASE 126.—Private ——, infantry, aged 24. Admitted to hospital complaining of sleeping badly, pains in the head, and inability to settle to anything. Family history negative. Past history: A previous attack of neurasthenia, caused by worry, in civil life. The patient had been at the front for over four months, and had kept perfectly well until he was slightly wounded in the tongue and mouth on May 4th, 1915. On the same day his brother was killed beside him. The wound had healed in a week, and the patient was transferred to a convalescent camp. He stated that he had been worrying about his wife for some time, but there was no reason for this, and it appeared to be symptomatic rather than related to the causation of the nervous condition. He remained in the convalescent camp for three weeks, keeping perfectly well except for slight headache which was increased by physical exertion. Two days before admission to hospital he remembered getting out of bed in the convalescent camp and then nothing more until he "woke" in the camp sick room. He was told that he had been found lying down in the camp, holding his hands to his head and talking about the trenches. When questioned about his sleep he answered that it had been very bad since the day he was wounded owing to horrible dreams which woke him with a start and shouting. The account of these dreams was only obtained with difficulty, the patient being most unwilling to speak of them, and breaking down with emotion on doing so. The incidents which recurred in the dreams were—"My brother shot—Men with their heads blown off—A pregnant woman caught in the stomach by a shell, the child and her bowels dropping out." These sights recurred again and again, not only in dreams, but also in waking states of mental abstraction. On examination the patient was found to be depressed and quietly emotional, but physical signs were negative, except for slight increase of knee-jerks and some fine tremor of the hands.

(2) *Losses.*—Losses help to cause shell shock in somewhat the same way as sights. The effect does not depend upon simple numbers, but upon clarity of realisation, a few losses, or even a single loss, clearly seen, or including friends or relatives, being much more potent than large general losses. In the case of a few losses clearly seen horror is added to terror, and if friends or relatives are affected these feelings are intensified and grief is superadded. Examples of the adjuvant causative action of losses are seen in Cases 38, 101, 68, 25, 141, and 126 quoted above.

(3) *Fright from an explosion.*—Simple fright from being near a shell or bomb explosion may suffice to cause shell shock by itself, but in most cases the additional fright due to partial or complete burial, or to other psychic factors, has been present as well. All my cases of burial were included in the consideration of possible physical concussion, and need not be referred to again here. In the following case, simple fright produced by a neighbouring explosion was the only apparent cause, and it is worth noting that the man was a neuropathic subject.

CASE 109.—Sapper ——, aged 19. Family history: Mother "nervous." Past history: Two years ago patient had an attack similar to the present one. It was caused by overwork, in no way connected with accident or fright, and resulted in his being away from work for five months. He had kept quite well at the front until ten days ago. Then, while he was in a dug-out, one shell pitched on top of the bank above it, and was followed a moment later by another shell which burst in front. These did no damage to the dug-out, except to cause a slight falling in. The patient stopped there and carried on with his duty that night, but he reported sick next morning, feeling very queer, and shaking slightly above the waist. He could remember getting half-way down the road to see the medical officer, but nothing more until he "came to" in the dressing station. This may have been about two and a half hours later, and he thinks that he had been found in a fainting condition on the road. After two days in hospital he was transferred to a convalescent camp, but later was readmitted to another hospital. He complained of "twitching" ever since reporting sick, and occasional slight frontal headache. He suffered from "funny feelings" at night, preventing sleep—e.g., "A man was over my head with a mallet, going to hit me." He also complained of "sort of dreams; there is somebody above me all the time." On examination there was constant tremor of both arms and slight tremor of the head and tongue, and jerky movements of the eyes. There was some spasm of the right leg, and both legs reacted to examination by violent tremor. Sensation was normal. The excitement of examination produced free sweating.

In this case physical concussion and gas intoxication are negatived by the trivial injury to the dug-out and the complete absence of immediate symptoms.

(4) *Sounds.*—Simple noise does no more than exert a slight adjuvant action in promoting psychic shock, and this action appears to be limited to the cases of a few men of neuropathic nature. As mentioned above, the sound of our own guns formed the final stimulus in one "anticipation terror" case. The following case is another example of noise as an adjuvant cause.

CASE 96.—Lance-Corporal ——, aged 36. Family history negative. Past history: Nerve debility four or five years ago, caused by overstudy of music. The patient did not have to stop work, but suffered from depression, anorexia, and insomnia for a period of 11 weeks. He was at the front for about four weeks, and got on well until one day when eight shells pitched near him. He was not hurt in any way, but after this he suffered from anorexia, insomnia, and depression. Twelve days later when billeted near some English artillery these guns were heavily engaged. No shells dropped near, but "the noise properly finished me off." Since that time the insomnia, depression, and anorexia had been more marked. Dreaming had not occurred, but the patient had not slept unless heavily drugged. His general condition was one of neurasthenia, and the insomnia was found to be real and difficult to combat.

These cases show that the psychic trauma of acute fright will cause shell shock. Sounds exert but a feeble action in the production of fright, and simple nearness to a shell explosion is not often sufficient by itself; but when an explosion causes burial of the individual, or mutilation of others, the intensity of terror or summation of terror and horror produced is often sufficient to break through the bounds of psychic resistance and lead to nervous collapse.

5. *Causes of Relapse.*

A consideration of the frequency and causes of relapse throws some sidelight on the general etiology of shell shock. Of the series of 150 cases no fewer than 41 (27·3 per cent.) were first seen by me when in a condition of relapse. These patients had been treated in other hospitals, transferred to convalescent or base camp as fit, or nearly fit, to go to the front again, and subsequently admitted under my care for nervous symptoms occurring in these camps. It may be assumed that the original condition of these patients had appeared slight and of little moment, but careful investigation revealed that they had never completely lost their symptoms. No less than 72·2 per cent. were of neuropathic predisposition. In most cases it was evident that the immediate cause of the relapse was the psychic strain of fear at having to go to the front again, and in some symptoms did not recur until they were actually starting for the front. This percentage of relapsed cases is greater than could be expected if the cause were an original finite physical trauma, but it is no more than we ought to expect in the case of an original trauma of psychic nature, and so still capable of conscious, or unconscious, action and reinforcement.

The general evidence shows that physical and chemical events can have exerted a causative influence in few, if any, cases of shell shock, the vast majority being certainly due to psychic trauma. To connect such psychic trauma with a "sex complex" is impossible.

It may be said that if psychic trauma be the cause of shell shock the wounded should suffer from it as much as the unwounded. That they do not do so is a well-established clinical fact, showing that shell shock and a definite wound

are to a large extent incompatible. It seems that the physical trauma of a wound tends to neutralise the psychic trauma which precedes or accompanies its production. In the case of a seriously wounded man psychic perception is blunted, or even completely suspended, for the time being. In the less seriously wounded attention is for the time being directed to the wound, and though acuity of psychic perception cannot be much blunted, it is diverted or side-tracked to such an extent that but little remains to trouble conscious memory. Further, the wounded man has something to show for his pains and discomfort, and a certain passport to immediate freedom from danger. In this manner the action of the psychic trauma is so much reduced that it lacks the intensity necessary to produce the conditions known as shell shock. I doubt, however, that it is entirely destroyed, and think it may manifest its presence later in promoting late nerve exhaustion or by predisposing to subsequent neuroses from other stimuli.

Conclusions.

1. The wounded are practically immune from shell shock, presumably because a wound neutralises the action of the psychic causes of shell shock.
2. Exposure and hardship do not predispose to shell shock in troops who are well fed.
3. While it is theoretically possible that physical concussion resulting from a shell explosion might cause shell shock, it is certain that this must be regarded as an extremely rare and unusual cause.
4. Chemical intoxication by gases generated in shell explosions cannot be more than a very exceptional cause of shell shock.
5. Gradual psychic exhaustion from continued fear is an important disposing cause of shell shock, particularly in men of neuropathic predisposition. In such subjects it may suffice to cause shell shock *per se*.
6. In the vast majority of cases of shell shock the exciting cause is some special psychic shock. Horrible sights are the most frequent and potent factor in the production of this shock. Losses and the fright of being buried are also important in this respect. Sounds are comparatively unimportant.
7. A consideration of the causes and frequency of relapses favours an original cause of psychic nature.
8. Any psychic shock or strain may cause a functional neurosis, provided it be of sufficient intensity relative to the nerve resistance of the individual. Such shock or strain need not have any connexion with "sex complexes."

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FAILURE OF THE RIGHT SIDE OF THE HEART AS A RESULT OF EXTENSIVE PULMONARY DISEASE.

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Two recent cases under the care of my colleague, Mr. H. Morriston Davies, at University College Hospital, both of which he very kindly asked me to study, led me to write a short paper upon the subject of this title. This consequence of pulmonary disease, I am aware, is one that has been recognised for many years, but the more intimate details which recent research upon heart disease has elaborated, and the forward progress of the treatment of pulmonary affections, seem to justify once more some observations upon the clinical symptoms. Accordingly, I will not delay with any minute description of the two cases in point, but, after alluding to the features which had attracted our attention, turn to the general consideration of right-heart failure secondary to extensive pulmonary disease.

The first case was a young woman suffering from chronic pulmonary tuberculosis. The second was a small boy with extensive pulmonary sclerosis and bronchiolectases. In both, with considerable rapidity, a change had taken place in the clinical picture. *The pulmonary condition had fallen into the background, and a series of symptoms, apparently cardiac, had become predominant.* Dyspnœa had increased, a very striking lividity of the whole integument, and notably of the face and extremities, had become permanent, dropsy and ascites had attained a high grade, and the liver in both cases was greatly enlarged. Venous engorgement was conspicuous, but the pulses—a point of importance—though strikingly rapid (120–140 per minute), were not arrhythmic; and the quantity of urine passed was considerable. These, together with a tricuspid systolic murmur, were the features which attracted attention and made it clear that some very definite change had taken place in the course of these illnesses.

It is some 20 years ago since Dr. Cheadle first directed my attention to this clinical phenomenon exemplified in a boy aged 14 years who had never suffered from heart disease, but had for years been the victim of severe bronchitis and emphysema. This patient also showed striking lividity and had developed extreme ascites and dropsy, with great enlargement of the liver and a rapid pulse. Dr. Cheadle then pointed out the predominance of the cardiac symptoms, which, he impressed upon me, had altered entirely the clinical appearance of a case that in previous years had been wholly pulmonary in its behaviour.

In April, 1916, Lutembacher, from the clinic of Professor Vaquez, published an admirable paper upon this same sequence of events, and to this paper, based upon a number of observations, I am indebted for further assistance in obtaining a clear conception of the sequence of events.

Failure of the right side of the heart may, as we know, occur under various circumstances. The most frequent cause is undoubtedly an organic mitral lesion, but among others it may result from a pulmonary stenosis or organic disease of the tricuspid valve. Rupture of an aortic aneurysm into the pulmonary artery is yet another though rare cause of this failure, as also primary sclerosis of the pulmonary arteries. The group before us, however, is the result of primary disease of the lungs, whether tubercular or due to non-tubercular cirrhosis of the lungs, or again to bronchitis and emphysema or carcinoma. In each case the essential lesion is a damage to a large area of the pulmonary circulation, not at its fountain-head, the pulmonary artery, but at the periphery as the result of the extensive chronic disease of the lungs. An outstanding feature of such cases will be that the cavity of the heart to feel the strain first is the right ventricle, the left side escaping, and accordingly we find certain peculiarities in the clinical symptoms.

The clearest example of the gradual evolution of primary failure of the right side of the heart is provided by such a lesion as pulmonary stenosis. The picture is not so obvious when the primary lesion is an extensive disease of the lungs and the course is not so simple. In pulmonary stenosis we find the right ventricle hypertrophying, and for some years this effort may prove successful; then signs of failure begin to appear. A triple rhythm may possibly mark the stage of transition; later all the signs of failure develop step by step. When, on the other hand, pulmonary disease is the cause, complete examination of the heart may be made difficult by emphysema, and further, while the right ventricle maintains its efficiency our attention is naturally directed to this pulmonary disease. It is only when cardiac failure supervenes that we are attracted to the minute study of the heart. Nevertheless, in this group, as in pulmonary stenosis, we recognise this common feature, the comparative integrity of the left side of the circulation.

If, then, we summarise some of the striking features of this group we find the following are the most important:—

1. A comparatively abrupt change in the appearance of the case from a pulmonary to a cardiac aspect. This is the most characteristic of all the features, for in cases of organic valvular disease of the right side of the heart the condition is throughout one of cardiac disease passing gradually from the stage of compensation to that of failure. On the other hand, when the cause of failure is due to organic disease of the left side of the heart, evidence of failure of the left side *precedes* the failure of the right, and though the lungs must suffer in this change the case is clearly a cardiac one throughout.
2. Great and general lividity. This symptom at once attracts our attention, and at the first glance suggests the "morbus cœruleus." The explanation is clearly dependent upon the diminished oxygenation due to the damage to the pulmonary circulation, the pulmonary disease, and the failing power of the right ventricle. It is a lividity not only of the face and extremities but also of the whole skin.
3. Great venous stasis and engorged jugulars. The latter sign leads to a short consideration of the venous pulse in these cases. Recent years have shown us that the character

of the venous pulse in the neck is primarily dependent upon the auricular part of the heart. If in mitral stenosis auricular fibrillation occurs, the *a*-wave necessarily vanishes, and if there is also much tricuspid regurgitation the ventricular pulse is established. In these cases, however, the strain falls first upon the right ventricle, and the right auricle may continue to contract actively, in fact with increased vigour, with the result that the *a*-wave, far from disappearing, may become more evident. The ventricular pulse, dependent as it is upon an inert auricle and tricuspid regurgitation, may not for the same reason appear. In other words, the particular venous pulse that may be found in these cases will depend upon the condition of the right auricle, which we must recognise may be working hard and far from a state of fibrillation.

4. Absence of conspicuous arrhythmia of the heart and pulse. These features were well illustrated in both the cases. In these the pulses, though strikingly rapid and small in volume, were very different from those we meet with so frequently in mitral disease with failure of the right side. In the last stages arrhythmia may supervene, but even this is not constant.

5. Associated with the preceding feature is the passage of a fair quantity of urine. This points also to the comparative integrity of the left side of the heart. In such a grave condition the urine is albuminous, and in the final stages renal stasis may supervene.

6. Great enlargement of the liver is the immediate result of the failure of the right side of the heart. In the tubercular cases the supervention of hepatic tenderness with enlargement deserves attention, for experience has shown that though enlargement of the liver is frequent in the tubercular, the increase is, as a rule, due to fatty change, and is not painful. The tenderness points to the rapid congestion of the liver.

7. Together with this symptom come those of ascites and œdema, which may be very extensive.

8. A tricuspid systolic murmur is detected on auscultation. The maximum is low down over the ensiform cartilage and its intensity varies. The presence of this murmur and the absence of others will afford strong support to the diagnosis that the failure of the right ventricle is secondary to primary disease of the lungs.

9. The results of radiographic examination. (*a*) It is seen on the screen that the enlargement of the heart is asymmetrical owing to the disproportionate size of the right side. The outline is not so circular as in failure the result of mitral disease, and the transverse measurement not so great. (*b*) The left border of the outline is not so circular as in mitral disease with failure of compensation, but makes an obtuse angle, the apex of which is formed by the junction of the upper limb constituted by the left ventricle with the lower formed by the right ventricle. (*c*) Lutembacher directs attention to the effect of the cardiac contraction in this condition. This uncovers from the shade of the diaphragm all the lower border of the right ventricle.

10. The pulmonary signs are extensive, for not only are there those which result from cardiac failure, but in addition, and more important, those which have been the primary cause of the failure.

When in a case of severe pulmonary disease this stage of cardiac failure appears the outlook is unfavourable and life may drag on for only a period of months. Dyspnœa, except when at complete rest, is persistent and progressive. The general venous stagnation makes the digestion difficult, vomiting frequent, and absorption imperfect. The high degree of cyanosis produces mental lethargy and actual somnolence. Death occurs from asphyxia with or without pulmonary hæmorrhages and infarctions, and in addition the original pulmonary disease may spread locally, or if tubercular disseminate to other organs.

It is very striking how after a brief and partial effect the cardiac tonics, such as digitalis, entirely fail to slow the heart or influence the dilatation.

The *diagnosis* of this form of cardiac failure is clearly one in which an accurate knowledge of the patient's history and a broad survey of the entire illness are indispensable. Considered apart from these essentials it is possible for several somewhat similar conditions to occur—for example, congenital heart disease, right heart failure secondary to disease on the left side, adherent pericardium strangling the heart, aneurysm of the aorta rupturing into the pulmonary artery, arterio-sclerosis of the branches of the pulmonary artery, failure of the right side of the heart prior to the failure of the left in chronic hypertension. In practice much difficulty will be avoided when we bear in mind that pulmonary disease occupies all the earlier history of this group of cases, that rheumatism takes no part, and that radiography will exclude the existence of an aneurysm. Aubertin and Girou's remarkable case of primary arterio-sclerosis of the pulmonary vessels showed symptoms similar in character, but there was no gross pulmonary disease, the lesions lying in the artery walls themselves.

The clinical picture of polycythæmia rubra lacks the great œdema and ascites and is usually a very different one, but one case under my observation deserves a brief description.

A man, aged 47, came to my out-patient department in December, 1914, for an opinion upon the condition of his chest, stating that for some months he had lost flesh and had coughed up blood-stained expectoration. Both upper lobes of the lungs were deficient in resonance and the air entry singularly deficient, but there were no moist sounds audible. My attention was attracted to his leaden-blue colour and to a definite enlargement of his spleen, and the possibility of polycythæmia rubra suggested itself. The blood count showed 6,800,000 red cells, with hæmoglobin 140 per cent. Repeated examinations of the sputum for tubercle bacilli were negative, and the X ray picture threw no light at all on the condition. I tried the effect of small doses of thyroid extract, then calcium lactate, and finally quinine and iron. After six weeks' stay he left hospital but still kept under my observation. His blood had been much improved by the quinine and iron. His colour was much less leaden and the red cells only numbered 5,610,000; hæmoglobin 120 per cent. In other respects he was no better; he still coughed up blood-stained sputum and complained of a stuffy sensation in the chest, and had lost weight. Four weeks later a striking change occurred in the physical signs in the development of complete dullness over the right side of the chest with much increase in the dyspnœa. The absence of any evidence of tuberculosis, coupled with the general trend and symptoms of the case, strongly suggested the presence of a neoplasm. Two pints of blood-stained fluid were withdrawn with passing relief, but death occurred on March 4th, 1915, after the appearance of thrombosis in the right femoral vein and pericarditis. The post-mortem examination showed primary carcinoma of the right bronchus spreading into both lungs, and involving the liver, suprarenals, and pericardium.

This case showed a remarkable combination in the occurrence of pulmonary symptoms with lividity and a high degree of polycythæmia, but the picture lacked entirely signs of right ventricle failure with the œdema, ascites, and great enlargement of the liver. In a second case of carcinoma of the lung the symptom of polycythæmia was present, but again the clinical picture lacked the signs of right heart failure.

The most real difficulty in diagnosis is the danger of focussing attention entirely on the pulmonary signs and attempting to explain all the cardiac symptoms as if they were pulmonary in nature under the hypothesis of a secondary toxæmia. Once more it may be repeated that the key to the solution lies in the change of the clinical picture from a pulmonary to a cardiac one. Examination after death demonstrates conclusively the nature of the cardiac lesion, for the right ventricle and auricle show extreme enlargement and the pulmonary artery itself may be considerably dilated.

I have ventured to dwell upon this condition because in recent years thoracic surgery has made important progress, and it may be helpful to call to mind this train of symptoms once more. For example, I would cite the operation for artificial pneumothorax in tubercular disease of the lungs, for there are many records of striking successes in suitably chosen cases. This point, however, we have to bear in mind, that in this particular endeavour to arrest the tubercular process it is unavoidable that for a time we put out of action a considerable portion of functioning lung, and in so doing must then disturb the balance of the pulmonary circulation and probably throw some considerable strain on the right ventricle. No doubt the balance is quickly adjusted, but it is possible that in a weakly subject the reserve power of the right ventricle may be rudely shaken and secondary heart failure encouraged. The surgeon has not only to consider the pulmonary lesions—often in themselves formidable enough—but the condition of the heart, and, indeed, the entire constitution, of his patient lest in benefiting the primary lesion he strike a serious blow to the all-important reserve power of the right heart and precipitate this form of cardiac failure.

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THE EFFECT OF FERRIVINE AND INTRAMINE ON SYPHILIS.

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IN view of the claims which have been advanced for the action of ferrivine and intramine on syphilis, the following account of a test which we recently made of these compounds may be of interest.

The biological and chemical hypotheses which have led Mr. J. E. R. McDonagh to consider di-ortho-amino-thio-benzene and tri-para-amino-benzine-ferric sulphonate (intramine and ferrivine) to be specific remedies against syphilis, have been discussed by him in recent papers, and we do not propose to deal with them here. For our purpose it is necessary to mention only Mr. McDonagh's main conclusions regarding the biology of the micro-organism of syphilis and the modes of action of antisyphilitic remedies.

As to the biology, Mr. McDonagh described in 1912 a life-cycle of the micro-organism of syphilis, in which it was asserted that the spirochæta pallida is not the cause of syphilis, but only the male phase of its micro-organism, which he called "the leucocytozoon syphilidis." The biochemistry of the various phases of this life-cycle and of syphilitic tissues as worked out by him has led Mr. McDonagh to the conclusion that Ehrlich was mistaken in considering that salvarsan acts by virtue of its parasitotropic effect; that, in fact, it acts by directly increasing the amount of active oxygen in the serum of the host and so increasing his resistance—an indirect and not a direct action on the parasite. According to this author, the active oxygen in the serum of the host can be increased directly by administering any strongly adsorbed metallic compound such as one containing iron or aluminium in trivalent form. In Mr. McDonagh's opinion it is not necessary, therefore, to use such a toxic metal as arsenic; iron will answer the purpose equally well. Hence his advocacy of ferrivine. According to Mr. McDonagh, ferrivine acts like salvarsan, and owing to its non-toxicity larger doses can be given, and they can be repeated at shorter intervals. Also, all these metallic compounds act only on the adult male phase (the spirochæta pallida) and the impregnated female. In the early stages of syphilis one commences treatment with a metallic compound, either ferrivine or salvarsan. In the later stages one commences with a compound which increases the active oxygen in the serum indirectly. Hence the introduction for this purpose of the sulphur compound di-ortho-amino-thio-benzene, or intramine.

We may say at once that we have been impressed by the fact that Mr. McDonagh's biological discoveries (published, as we have mentioned, in 1912) have not been publicly confirmed by any biologist of standing, although probably most biologists favour the idea that the micro-organism of syphilis has a life-cycle. Also, that eminent chemists have confessed themselves unable to understand his chemistry. Recognising that this might prejudice our practical tests of intramine and ferrivine, we have taken particular care to guard against their influence, cross-checking our observations and submitting them to others for confirmation or otherwise. Having been favoured with a supply of these compounds by the British Drug Houses, Limited, to whom we would here express our indebtedness, we chose for the test three ordinary cases of secondary syphilis, cases with well-marked lesions, the clinical progress of which could easily be watched, and from which it was easy to obtain specimens for microscopic examination. The details of the cases are as follows.

CASE 1.—Patient aged 27. Healed indurated frenal chancre of two months' duration. Anal mucous patch (dry). Pigmentation of macular rash still present on trunk. Mucous patch on upper lip; fauces ulcerated. S. pallida present. May 3rd, 1916: First injection 1 gm. ferrivine, diluted to 200 c.c. with distilled water. Vein washed through afterwards with normal saline. The patient became extremely collapsed on the table, with respiratory distress. Pain in epigastrium followed by repeated vomiting. Vomited during the night in the ward; slight rigor. Temperature 101° F. 4th: S. pallida still present in mucous patches. The patient had recovered from the reaction. 5th: Second injection 1 gm. ferrivine. Technique as above. The patient again became collapsed on the table and vomited. Profuse perspiration. Temperature 99·4°. 7th: Veins of both arms thrombosed. S. pallida still abundant in unaltered mucous patch on the lip. 9th: S. pallida still present. 10th: S. pallida still abundant in the morning. It was here decided to discontinue the ferrivine course, and 0·3 gm. salvarsan was administered without reaction. 11th: S. pallida disappeared from mucous patch (which has markedly altered in appearance) 18 hours after 0·3 gm. salvarsan injection. 12th: Mucous patch healed. No S. pallida found after a thorough search by different observers.

CASE 2.—Patient aged 25. May 1st, 1916: Multiple indurated ulcers in coronal sulcus of glans penis. Papular lichenoid syphilide, nape of neck, around elbows and over both hips (symmetrical). Also faint erythema. S. pallida present in chancres. No albumin in urine. First injection 1 gm. ferrivine solution diluted to 200 c.c. with distilled water. Vein washed through afterwards with normal saline. Severe reaction whilst on the table. Respiratory distress. Pain in epigastrium. Pulse very weak. Profuse perspiration. Vomited. Slight rigor at 6 P.M. Temperature 101·2° F. 2nd to 5th: S. pallida in chancres on daily examination. Vein thrombosed. Rash unaltered. Second injection of ferrivine 1 gm. on May 5th. Technique as above. Similar reaction and vomiting. Temperature 101·6°. 7th: 1 gm. intramine injected intramuscularly. 8th: Bad night, severe pain from intramuscular injection. Patient vomited during night. Temperature 101·6°. S. pallida still present in chancres which are not yet healed. 10th: Third injection 1 gm. ferrivine. Less reaction. Patient vomited in ward. Temperature 101·6°. 12th: Veins of both arms thrombosed. Cannot bear pressure at site of injection of intramine. S. pallida still present. 14th: Fresh papules appeared on both flanks. Snail track ulcers developed over right tonsil. S. pallida present in same. Both new lesions. Site of intramine injection very painful and swollen. 16th: Both fauces ulcerated. S. pallida present. Penis healing. Site of intramine injection painful, infiltrated and fluctuating in centre. 17th: Treatment with salvarsan and mercury commenced.

CASE 3.—Patient aged 39. May 2nd, 1916. Condition on admission: Large indurated mass at frænum under phimosed prepuce, duration approximately six weeks. Profuse papulo-pustular rash general. General adenitis. Anal mucous patch. Moist papules on scrotum and inner surfaces of thighs. Fauces ulcerated. No albumin in urine. S. pallida present in moist papules by dark-ground examination. 3rd, 3.30 P.M.: First intravenous injection 1 gm. ferrivine; solution diluted to 200 c.c. with distilled water, and vein washed through with normal saline. Whilst on the table patient exhibited sudden respiratory distress, with pain in the epigastrium, and turned an ashy-grey colour. The pulse became imperceptible and the patient broke out into profuse perspiration and was then violently sick. 6 P.M.: Rigor. Temperature 102° F. Vomited again; severe headache. Diarrhœa ensued during the night with persistent vomiting. The symptoms subsided on the following day. Temperature 99°. 4th: S. pallida still present in moist papules. 5th: Second injection 1 gm. ferrivine. Same technique. Similar reaction to above. Severe rigor at 6 P.M. Temperature 103°. S. pallida still present. Vein used at previous injection now thrombosed. 7th: 1 gm. intramine into gluteal muscles. "Rough night." Pain excruciating. S. pallida still present in moist papules. 8th: Site of intramine injection very swollen and tender. Marked œdema of lumbar region. Patient unable to lie on that side. S. pallida still present in moist papules. 9th: S. pallida still present. Patient somewhat more comfortable. 10th: Third injection ferrivine 1 gm. Reaction not so severe, but patient again vomited. Temperature 99°. 12th: Rash beginning to fade (nine days after first injection). Papules on scrotum still moist. S. pallida present. Site of intramine injection swollen and tender. Superficial veins of both arms thrombosed from insertion of deltoid to 6 inches above the wrists. 14th: S. pallida still present. 16th: S. pallida abundant in chancre. 17th: Site of intramine injections infiltrated and painful. Much albumin present in urine, with epithelial casts. Ulceration of fauces more marked. Treatment with salvarsan and mercury commenced.

From the above account it will be seen that the local and general reactions which follow the injection of these preparations are by no means pleasant. In the case of intramine the pain is undiluted torture, and lasts so for two or three days. One of us had previously treated four cases with intramine and the same local reaction occurred in these. In two of them abscesses have burst outwardly, one of which is

still discharging necrotic débris, ten weeks after the injection, and will take many more weeks to close. In those cases where no abscess has yet burst it is easy to feel by the gap in the muscles that considerable necrosis has occurred. None of these effects can be ascribed to sepsis, as most rigid aseptic precautions were taken. Further, particular care was taken to make the injections strictly intramuscular. The constitutional symptoms which follow immediately upon the injection of ferrivine are distinctly alarming, and such as would cause one to hesitate before injecting this remedy into any but robust patients.

As to therapeutic effect we found: 1. That ferrivine entirely failed to cause S. pallida to disappear from the lesions of three well-marked cases of secondary syphilis. 2. After the failure of ferrivine to cause the disappearance of spirochæta pallida from a mucous patch a single dose of 0·3 gm. salvarsan effected this in 18 hours, and the patch, which had hitherto been uninfluenced, had healed within 48 hours. 3. Clinically we were unable to detect any influence of either or both these compounds on syphilitic lesions, although each of them was of the variety which heals in a week or ten days under salvarsan treatment. 4. Further syphilitic lesions appeared immediately after the treatment in one of the two cases treated with both ferrivine and intramine. A mucous patch appeared on one tonsil as well as further syphilitic papules from which spirochætes were obtained. The other case developed nephritis, with albumin and epithelial casts, which was not present prior to the injections.

Our conclusions are (1) that intramine and ferrivine are extremely unpleasant in their effects, and (2) that they have no specific effect on early syphilis.

Since the above was sent in for publication we have treated the following case of tertiary syphilis which is of interest in connexion with this subject.

CASE 4.—Patient aged 39. Contracted syphilis four years ago. Commenced treatment during the secondary stage with mercury pills and mixture, and continued same for two years. Five weeks ago a gumma developed over the head of the left fibula.

On admission the patient had multiple gummata on each leg. Some could be felt as nodules in the muscles, some subcutaneous, and others in various stages of necrosis with resultant ulcerations. There was one large ulcer situated over the left popliteal space. The upper extremities, head, and trunk were unaffected except for one small gumma over the left lower ribs. The pupils reacted equally well to light and accommodation. Reflexes normal. Wassermann reaction positive. May 24th, 1916: 1 gm. intramine injected into the muscles of the left gluteal region. 25th: The patient passed a sleepless night from exquisite pain at the site of injection. Hot fomentations applied. 26th: Left buttock very tender, painful, and swollen. Morphia administered. 30th: Much œdema of lumbar cushion. No albumin in urine. Pain from injection less. Swelling more localised, and could be made to fluctuate. Gentle massage, followed by hot fomentations. Two gummata, which had not previously involved the skin, had now broken down, and were discharging through same. 31st: Two fresh gummata over the head of the right fibula. June 1st: To this patient was administered yesterday 1 gm. of ferrivine solution diluted to 200 c.c. with distilled water. It was not without a feeling of grave responsibility that we gave this injection, taking into consideration the reactions previously witnessed during and after the introduction of ferrivine. We must state emphatically that the reaction which resulted in this instance was the most severe we have ever experienced after an intravenous injection of any of the antisyphilitic remedies with which we have worked up to the present. The alarming symptoms came on towards the end of the injection, commencing with severe epigastric pains, followed by marked dyspnœa. The pulse then became imperceptible, and the patient turned an ashy-grey colour. Strychnine was immediately administered hypodermically, and for a period of some minutes there was grave doubt as to the patient's survival. He was finally resuscitated and passed a disturbed night; rigors ensued and persisted until the following afternoon. As no clinical improvement occurred during the next eight days, the patient was prescribed a course consisting of salvarsan, potassium iodide, and mercurial inunction.

GREAT NORTHERN CENTRAL HOSPITAL, HOLLOWAY-ROAD, N.—This being the diamond jubilee year of the hospital, the authorities of the hospital are inviting a large company to a "View Day," which is fixed for Wednesday, June 28th. The wards can be visited from 3.15 to 5. P.M.

A CASE OF ERB-DUCHENNE PARALYSIS DUE TO A BULLET WOUND OF THE FIFTH CERVICAL NERVE.

SPINAL ACCESSORY ANASTOMOSIS; RECOVERY.

BY GEORGE L. PRESTON, M.R.C.S., L.R.C.P. LOND.,
SURGEON, MILITARY HOSPITAL, DEVONPORT.

THE case here described is that of Private ——, aged 19 years, who was admitted to hospital on July 27th, 1915, with a history of having been shot while trench-digging in Gallipoli, the bullet passing through the right side of the neck. There was immediate paralysis of the right arm. He was in hospital in Malta for 14 days, during which time his wounds healed. He was then transferred to England.

On admission there were healed wounds of the neck, the entrance wound being situated just internal to the anterior border of the right sterno-mastoid muscle at the level of the pomum adami of the thyroid cartilage, the exit at the back on a level with the sixth cervical spine about an inch and a half from the mid-line. There was marked wasting of the right arm and shoulder, paralysis of the rhomboids, supra- and infra-spinati, subclavius, deltoid, biceps, coraco-brachialis, and brachialis anticus; partial paralysis of the pectoralis major, and some weakness of the supinator longus and muscles of the forearm, but no actual paralysis. Both epicritic and protopathic sensation were normal; no circumflex anæsthesia. The patient was quite unable to abduct the arm, and could not raise his forearm off the bed. In the erect posture the arm hung by the side in the position of pronation. All efforts to flex the forearm only resulted in a spasmodic contraction of the extensors of the wrist and fingers. Electrical reactions showed reaction of degeneration in the supra- and infra-spinati, deltoid, biceps, coraco-brachialis, &c. The supinator longus and the muscles of the forearm were normal. A diagnosis of a lesion of the fifth cervical nerve was made, either a physiological or an anatomical division—i.e., a severe nerve concussion plus pressure from scar tissue or a complete division; clinically, of course, these cases are the same. As there was no sign of improvement after treatment by massage, &c., operation was decided upon.

Operation.—This was performed on August 7th. Under ether anæsthesia a large flap of the skin was reflected, the incision passing along the posterior border of the sterno-mastoid and then outwards along the upper border of the clavicle for about 4 inches. The external jugular vein was ligatured and divided, giving free access to the whole of the posterior triangle of the neck. The upper trunk of the brachial plexus was then traced upwards to the interval between the scalenus anticus and medius, until scar tissue was encountered in the line of the bullet wound. By careful dissection in this scar the distal end of the fifth cervical nerve was found to be completely separated from its proximal portion, the sixth nerve lying below it quite intact, but the communicating branch was also found to be severed between the fourth and fifth nerves; ultimately deep down on the vertebræ the proximal part of the fifth nerve was similarly embedded in dense scar tissue. When the end was eventually freed there was found to be a deficiency of nearly an inch, which made end-to-end suture impossible. The spinal accessory nerve was therefore isolated and divided as far back as possible after its emergence from the sterno-mastoid, and this was sutured to the distal portion of the fifth cervical. The anastomosis was then covered by a pad of fat and fascia, which was transplanted from the neck and sutured around the junction in the form of a sleeve, the upper portion of which was carried up and around the proximal part of the divided nerve, in the hope that a few fibres might find their way down this path. The wound was then closed, except for a small drainage-tube under the skin at the outer angle of the incision, which was removed at the end of 48 hours. The sutures were removed on the tenth day (August 17th). Healed per primam.

After-treatment.—Massage and galvanism were again commenced after a short interval and the biceps and deltoid were relaxed by means of a suitable splint. The supinator longus improved sufficiently after a few weeks to enable the forearm to be slightly flexed with difficulty. September: Little change. Supinator longus much improved after massage, flexion of forearm possible by this means. October: General condition the same. November: Signs of recovery in biceps; efforts to flex forearm show slight contraction. December: Some abduction of arm possible; biceps greatly improved. January, 1916: Marked improvement in all movements. Biceps contracting well; brachialis anticus and coraco-brachialis showing signs of recovery. Abduction of arm more marked. February: Still improving; complain-

of some discomfort in the scar from pressure of braces. March: Slight contractions of the supra-spinatus can now be demonstrated. Abduction is possible against resistance to the extent of a right angle with the trunk; the flexion of the forearm nearly normal. The patient can now raise his arm above his shoulder without much effort. He can perform all ordinary movements with ease and quickness. There is a certain amount of weakness, of course, but apart from this I consider the arm on the affected side almost as good as the sound one. There is a difference in circumference of just over an inch measured around the most prominent part of the biceps of each arm, and the condition is still improving.

The case is interesting from the surgical aspect on account of the rapid recovery (seven months) following an anastomosis where such a disproportion in size existed between the nerves involved, the spinal accessory being a small path for the functions of the fifth cervical; but being the only available nerve at the time I had to make the most of the material at my disposal, and I think that the result more than justifies the procedure, there being now quite good flexion of the forearm and abduction of the whole arm to a right angle of the trunk against resistance, with ability on the part of the patient to perform all the ordinary movements necessary to everyday life, to dress and undress himself without assistance, and to carry ordinary articles which do not put an undue strain on a recently paralysed arm. The early signs of recovery seen in the biceps were also striking, occurring as they did before similar ones in the deltoid, from the point of view of central regeneration of the nerve fibres.

Lesions of the musculo-spiral, median, and ulnar nerves, and even of the brachial plexus itself are fairly common, but an opportunity of suturing individual cervical nerves before they have entered into the formation of the plexus is seldom met with. The small size of the nerve, the great depth from the surface, and the dense fibrous tissue of the scar, often involving adjacent important structures, present innumerable difficulties in isolating the divided ends and in suturing, which can only be overcome by careful dissection, endless patience, and an untiring spirit not only on the part of the surgeon but also on the part of the anæsthetist; but when that which to all intents and purposes amounts to a complete recovery is attained, it repays a thousandfold for the time and trouble and care bestowed upon a case which at first sight offers so little prospect of success.

I am indebted to Lieutenant-Colonel Kay, officer in charge, Military Hospital, Devonport, for permission to publish these notes.

Devonport.

THE DIAGNOSIS OF DEXTROSURIA AND PSEUDO-LÆVULOSURIA.

BY P. J. CAMMIDGE, M.D. LOND., M.R.C.S., L.R.C.P. LOND.

THE increasing number of cases diagnosed as "diabetes" in which the patients on investigation have proved to be passing urine free from dextrose referred to me for treatment during the past year or two and the apparent frequency of such cases among our troops prompt me to write a short and preliminary note on the methods by which dextrosuria may be differentiated from "pseudo-lævulosuria," a condition for which it is commonly mistaken. It is a matter of considerable clinical importance that they should be clearly distinguished, for dextrosuria can only be controlled by suitable restriction of the carbohydrate intake; while pseudo-lævulosuria is benefited by an entirely opposite line of treatment—namely, a diet containing an abundance of carbohydrate with reduction or temporary elimination of proteins. When dextrosuria and pseudo-lævulosuria occur together, as is often the case, the most satisfactory results are obtained by a series of alternating diets calculated to deal with each in turn.

In order to eliminate the difficulties that arise in testing the urine for sugar with Fehling's solution it is advisable to employ Benedict's more sensitive and reliable test as a routine. It is a single solution which keeps indefinitely, does not react with creatinine, uric acid, and other interfering substances, and is about ten times as sensitive to sugar as Fehling's solution. With 0·3 per cent., or over, of dextrose it gives a characteristic reaction on boiling, but with smaller quantities the precipitate forms only on cooling. A similar delayed reaction is characteristic of pseudo-lævulose (iso-glucuronic acid), which does not reduce alkaline copper solutions as readily as dextrose. The formation of a precipitate as the solution cools is suggestive, therefore, of pseudo-lævulose or a small quantity of dextrose. To differentiate the two, Borchardt's modification of Seliwanow's test is employed. A mixture of 4 c.c. of the urine and 1 c.c. of Seliwanow's reagent (resorcin, 0·5 gm.; hydrochloric acid, sp. gr. 1·195, 30 c.c.; distilled water 30 c.c.) is heated to boiling in a water bath for a few minutes. If pseudo-lævulose or true lævulose is present the solution assumes a purple-red colour, but dextrose alone gives no colour change. To differentiate pseudo-lævulose from true lævulose the solution is cooled, made alkaline with solid sodium carbonate, and extracted with 2 or 3 c.c. of ethyl acetate. If true lævulose is present the ethyl acetate extract is red or pink, but if the positive result was due to pseudo-lævulose the watery solution retains the pigment, and the extract is yellow or brown. The diagnosis may be confirmed by preparing the para-bromphenylosazone and taking its melting-point. The osazone of pseudo-lævulose melts at 256° C., that of true lævulose at 197° C., and the osazone of dextrose at 220° C., while the hydrazone of glycuronic acid melts at 236° C.

In conjunction with Mr. H. A. H. Howard, I have devised a method by which dextrose may be estimated in the presence of pseudo-lævulose, &c., and the amount of the latter may be determined by difference. This is based upon the fact that pseudo-lævulose, also true lævulose and glycuronic acid, is precipitated from alkaline solutions by calcium, while dextrose remains in solution. The total reducing power of the urine is first determined by some reliable method, of which I find Scales's or Bang's to be the most satisfactory. Into a 15 c.c. centrifuge tube are then placed 10 c.c. of the urine, 4 c.c. of a solution of calcium chloride (10 per cent.), and 1 c.c. of sodium hydrate solution (30 per cent.), and the contents are well mixed. The tube is centrifuged for three or four minutes to separate the precipitate as much as possible, and the clear supernatant fluid filtered off. The reducing power of 7·5 c.c. of the filtrate, corresponding to 5 c.c. of the original urine, is then determined in the same way as for the total sugar. The result, allowing for the dilution, gives the percentage of dextrose, and the difference between this and the "total sugar" shows the percentage of pseudo-lævulose (also true lævulose and glycuronic acid). If true lævulose was found by the qualitative tests, a very rare occurrence in my experience, it may be estimated by ascertaining the reducing power of the filtrate from a specimen of the acidulated urine treated with a saturated solution of lead acetate, since the lead salts of dextrose and true lævulose being soluble remain in solution, but the insoluble pseudo-lævulose salt is precipitated out and remains behind on the filter.

I have prepared this note in the hope that it may be the means of helping some who find that their cases of "glycosuria" and "mild diabetes" do not respond to regulation methods of treatment in the way they expect to arrive at an explanation, and also with the certainty that it will lead to a revision of the diagnosis in many instances where patients have been rejected for life insurance, &c., owing to the presence of "traces of sugar" in the urine. I hope to deal at length with the clinical, pathological, and chemical aspects of the subject on a future occasion, when circumstances are more propitious and I have had further time for investigating it.

Nottingham-place, W.

THE SOCIETY OF EDUCATION.—A research committee of the Society of Education has undertaken an inquiry the object of which is by means of a questionnaire to collect from adults information as to the ways in which they, as children, became aware of the facts of sex, birth, and parenthood. It is felt that a mass of such information, together with an expression of personal opinion upon the recognisable effect of such means of securing information, should provide considerable illumination of the problem of sex-education. The committee is seeking the coöperation of adult persons who are willing to assist the inquiry by answering the questionnaire, and, with a view to obtaining unfettered reply, asks that the forms should be filled in and returned anonymously. Application for the forms should be made to the secretary of the Research Committee, Society of Education, 9, Brunswick square, W.C.

Clinical Notes:

MEDICAL, SURGICAL, OBSTETRICAL, AND THERAPEUTICAL.

GUNSHOT WOUND OF RIGHT ORBIT AND MAXILLA;

MUCH DESTRUCTION OF BONE AND SOFT PARTS; ADAPTATION OF ARTIFICIAL EYE AND CHEEK.

BY SIR WILLIAM J. COLLINS, K.C.V.O., M.S., M.D., B.Sc. LOND., F.R.C.S. ENG.,
OPHTHALMIC SURGEON TO THE KING GEORGE HOSPITAL, ETC.

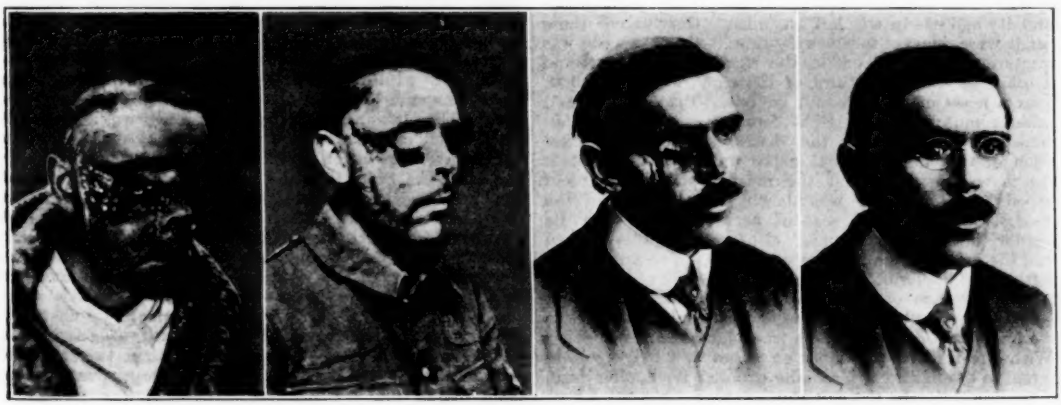
Private ——, aged 32, was severely wounded on the right side of the face by a bullet at Ypres on Oct. 30th, 1914. He was taken prisoner by the Germans, but while in hospital was placed under the care of two French surgeons, also prisoners—viz., Dr. Bettremieux and Dr. Ballenghien, both of Roubaix. From notes made by the latter, which I have seen, it appears that on Nov. 9th, 1914, the patient had an enormous wound of the right side of the face, extending from the ear to the nose, the soft parts including the right globe, and portions of the eyelids were destroyed and there were fractures of the right malar, superior maxillary, lacrymal and nasal bones causing a large opening between the nose and the right orbit. Seven operations were performed between Nov. 12th, 1914, and March 4th, 1915, at first for the removal of the remains of the globe and of sloughs, and later of a plastic nature with a view to restore the cheek. Deafness of the right ear having supervened paracentesis of the tympanum was performed.

The patient was admitted under my care at the King George Hospital on June 29th, 1915, and I performed two further plastic operations, suturing together the palpebral margins and also closing the sinus into the nose. I felt that the aid of art might then be more usefully called in rather than attempt any further effort at blepharoplasty. I accordingly designed an artificial cheek of painted and moulded copper-plate, with eye attached, set in a pair of spectacles, similar to a contrivance I had previously employed in a case where I had removed an eye and superior maxilla for sarcoma.[1] Mr. Eastgate, of Messrs. Sillis, Strudwick, and Co., took great pains in constructing this apparatus, and his mechanical and artistic skill have, as the series of accompanying photographs serve to show, achieved a highly satisfactory result.

The first photograph shows the condition of the wound in the early days, the second after the kindly and skilful work of Dr. Ballenghien, the third represents the state on leaving the King George Hospital, and the fourth the appearance with the artificial cheek and eye applied.

Albert-terrace, Regent's Park, N.W.

[1] See THE LANCET, Sept. 29th, 1894, p. 736.



Reproductions of photographs illustrating Sir William Collins's case of gunshot wound of right orbit and maxilla.

TWO CASES OF STRANGULATED UMBILICAL HERNIA.

BY F. L. HARMAN BROWN, M.B., C.M. EDIN.,
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AND
E. W. G. MASTERMAN, M.D. DURH., F.R.C.S. ENG., D.P.H.,
SENIOR HOUSE SURGEON, COVENTRY AND WARWICKSHIRE HOSPITAL.

THE two following cases appear to us worthy of record on account of their peculiar difficulty and successful issue. The patients were both unusually fat, middle-aged women, both were operated on within three days, and both left the hospital on the same day. They suffered from chronic emphysema, asthma, and albuminuria.

CASE 1.—The patient, aged 55, was admitted to hospital on March 2nd, 1916, with a history that she had had complete intestinal obstruction for three days and had been vomiting all she took. The patient vomited in the ward soon after admission. She was an immensely stout woman, and was said to have weighed 18 st. before this illness (she weighed 16 st. 9 lb. when discharged). She had had an umbilical hernia for several years. On admission the patient was in great pain, and she had a large, nodular, irreducible and very tender mass half buried in the thick deposit of fat over the abdominal muscles. Temperature, 97° F.; pulse, 104. The condition of the patient was very unfavourable. She had chronic bronchitis and emphysema, and her face was chronically cyanosed; there was a considerable quantity of albumin as well as some blood and pus in the urine. In consequence of these conditions the operation was done entirely under local anæsthesia, codranine being used.

The herniated mass was dissected out of the subcutaneous fat and the narrow opening in the abdominal fascia was enlarged. On opening the sac the contents were found to consist largely of omentum, much of which was deeply congested, and partly of large intestine. All the sac contents were adherent to each other and to the peritoneal covering. The omentum was ligatured and removed along with a great part of the coverings of the hernia, and the remainder of the peritoneal covering adherent at the neck being carefully divided it was returned together with the intestine and the stump of the omentum to the abdominal cavity. The wound was then sewn up in layers. The patient bore the operation well. The vomiting ceased at once and she passed flatus a few hours later. On account of the condition of the chest she had to be propped up in a sitting posture from the first, and her cough and asthmatic breathing were very troublesome for the next fortnight. She had an enema with successful result on the 6th and the 9th, and her bowels were open naturally on the 11th. The wound healed by first intention and, after being fitted with a proper belt, the patient left the hospital in good condition on April 8th.

CASE 2.—The patient, aged 47, was admitted on March 5th, 1916. She was very fat (weight on leaving 13 st. 7½ lb.), but not like the previous case. She had had an umbilical hernia for 16 years, gradually growing larger. She had had several attacks of semi-obstruction, and three months before a severe one which was thought to be commencing strangulation. She had never worn any belt or truss. On March 3rd

the patient was seized with severe pain in the hernia, and during that night she commenced vomiting. The bowels were opened slightly on that night but not since. Just before admission she had had an enema.

On admission the general appearance of the patient seemed very much better than that of the patient in the previous case, and the vomiting had then quite ceased for 24 hours, but the temperature was 97·6° F. and the pulse 104; the tongue was furred, and there was a trace of albumin in the urine. The hernia formed a rounded, tightly distended, and very tender mass of about the size of a large orange, lying in the immensely thick, fatty layer of the abdominal wall. The skin over the mass was tight and distended.

Under anæsthesia by ether an incision was made over the most prominent part of the mass and gangrenous intestine presented itself, which at once gave way with the escape of gas. As it was impossible to deal with the strangulated mass directly, the opening in the abdominal wall was enlarged, the peritoneal covering of the sac was cut away at its neck, and the whole mass was drawn forwards. It was then seen that a loop of transverse colon was strangulated in the sac, together with a considerable mass of omentum. The latter was transfixed and tied off. The two ends of the colon were clamped, and the whole hernia, sac and contents, was cut off. The two ends of the divided colon were now united end to end and returned to the abdomen, and the wound in the abdominal wall was closed in layers. The patient bore the operation exceedingly well. She slept soundly the night following, after 1/4 gr. morphia given hypodermically. On the next afternoon the temperature rose to 101·4°, and remained at about 100° for the next three days, after which it sank to normal. Flatus was passed and the bowels were opened on March 7th; no vomiting and no cough, although the breathing was asthmatic in character. She had no abdominal symptoms from the time of the operation, and having been fitted with a special belt she left the hospital in good condition April 8th.

A CASE OF TENDON TRANSPLANTATION FOR WRIST-DROP.

BY ARNOLD K. HENRY, M.B., B.CH. DUB., F.R.C.S. IREL.,

LATE SURGEON TO THE SERBIAN MILITARY HOSPITAL, POSHAREVATZ.

THE patient, a Serbian, who had been wounded in November, 1914, came to me in September, 1915. His wounds numbered five; all were due to bullets, and all had been received simultaneously, four in the right upper extremity and one in the left shoulder. Only two of these wounds were relevant to the wrist-drop. Of these, one was a fracture of the lower end of the right humeral shaft and the other of the upper third of the right radius. In both places a mass of callus could be felt. The extensor and supinator muscles of the right forearm were wasted, but cutaneous sensation over the distribution of the radial branch of the musculo-spiral nerve was scarcely affected. Thus it was probable that the musculo-spiral trunk had escaped harm from the wound which had fractured the humerus, and that the seat of nerve injury lay in its posterior interosseous branch, either where this passed round the radius in the forearm or in the upper arm beside the fractured humerus. The uncertain position of the lesion and the presence of much callus made the prospect of successful nerve suture so inconsiderable that I decided to correct the wrist-drop by tendon transplantation.

With the forearm supinated on a board, a long incision internal to the flexor carpi radialis exposed its tendon from the muscle belly to the anterior annular ligament. Two sutures of fine chromic gut were passed through the tendon at points half an inch apart, close to the annular ligament. The tendon was divided between these sutures and freed towards its fleshy origin. Fortunately the patient had a palmaris longus muscle in the right arm, and I divided its tendon close to the annular ligament and sutured the proximal end of it to the distal portion of the flexor carpi radialis tendon, so as to supply a frail substitute for that muscle. The wound was then covered by a towel wet with hot saline and the arm pronated. A long incision exposed the extensor communis digitorum tendons; these were slightly freed, their adjacent surfaces were scraped, and the four were sutured together just proximal to the wrist to form a single broad extensor tendon. The forearm was again supinated and the ends of the proximal suture through the flexor carpi radialis were caught in the tip of a Kocher's forceps. This was passed between the flexor longus pollicis and the profundus digitorum, and gently forced through the interosseous membrane at the middle of the forearm. By means of the suture the flexor tendon was easily drawn to the extensor aspect of the forearm through the aperture in the tissues held wide for it by the jaws of the forceps. The four extensor communis tendons were pulled proximally, and when they were taut enough to half extend the wrist the free end of the flexor tendon was sutured to the place where the four had been united. The incisions were then closed.

The rapid advance of the Germans prevented me from following the case for longer than a month, but at the end of that time the position of the wrist was good and its condition encouraging, for the patient, although he could not yet actively extend his wrist, was able to keep it extended in pronation for a short while after it had been placed for him in that position. Further, on the twenty-first day after operation he wrote his name with the right hand for the first time since his injury, and he wrote it distinctly.

Bray, Co. Wicklow.

Medical Societies.

ROYAL SOCIETY OF MEDICINE.

SECTION FOR THE STUDY OF DISEASE IN CHILDREN.

Exhibition of Cases.—Communications.

A MEETING of this section was held on May 26th, Dr. E. CAUTLEY, ex-President, being in the chair.

Dr. CAUTLEY showed two cases of Optic Neuritis (? Cerebral Tumour). The first case, a boy aged 6 years 8 months, attended as an out-patient at the Belgrave Hospital for Children on April 17th under Dr. H. R. Prentice, who admitted him the following week with the subjoined notes:—"April 10th: Headache for two weeks. Wakes up screaming at night. Anorexia, furred tongue, offensive breath, (?) vomiting, B.O. April 17th: Not so well; headache, retching, drowsiness. Arm reflex greater on the left than right side; normal abdominal reflexes; knee-jerks equal and brisk. Gait unaffected. Optic discs swollen, and hæmorrhage on the left disc. He vomited during the afternoon but did not complain of headache." Since being in hospital he had not suffered from headache or vomiting. Mr. Bishop Harman's report on the eyes on May 9th was as follows: "Bilateral papillitis, 1·5 D. elevation. Fine interstitial hæmorrhages at left disc, no exudation. No disorder of fixation." There was no albuminuria. The gait was a little stiff. The second case was that of a girl, aged 11 years, admitted to Belgrave Hospital on April 27th. One month previously she had two fits. Since then she had had almost constant headache and vomiting the result of the headaches. On April 26th she had another fit. She was a strong, highly coloured, healthy-looking girl. Her abdominal reflexes were practically absent; the deep reflexes were depressed, the left rather more marked than the right; plantar reflexes absent. Her head was tilted somewhat towards the right shoulder, which was a little raised. The gait was somewhat unsteady, (?) cerebellar, and she tended to fall backwards and to the left. Her left side was a little weaker than the right and showed slight incoördination, probably sensory; and for the same reason the left movements were clumsy. The eyes showed nystagmoid movements, lateral and rotatory, and slight left convergent squint. Perhaps there was a little weakness of the left facial nerve, and there was double optic neuritis. Mr. Bishop Harman's report (May 9th) was as follows: "Nystagmus on extreme duction, tendency to left convergent squint; well-marked papillitis in each eye, about 2 D. elevation, a trifle more on right side; no hæmorrhages or exudation; slight silkiness of right macular region." Since being in hospital no special symptoms had been noted and she had not suffered from headache or vomiting.

Dr. CAUTLEY also showed a case of Infantilism in a boy aged 6 years 8 months (sixth child). He was said to have been a puny baby, but to have grown up to 3 months of age. At the age of 9 months he only weighed 4½ lb., and from 13 to 18 months of age he remained stationary at 6 lb. 1 oz. He was entirely breast-fed for one and a half years and partially so for another six months. Proprietary foods were

given up to the age of 4½ years, and since then he had had ordinary diet. His mother suckled her previous baby for 18 months, up to her confinement with this child. During the first year of life he was remarkably somnolent; and at the age of 3 years he had diphtheria. At times he was troubled with constipation, and occasionally with cramps in the hands and feet. He had had no such troubles during the two months he had been under observation. Condition on May 18th: height, 26½ in.; weight, 16 lb. 14 oz.; head, 17 in. He was pot-bellied, markedly rachitic, and the liver had dropped well below the costal margin. There were enlarged tonsils, adenoids, and moderate adenitis. The skin was elastic and complexion rather dull. He spoke fairly clearly, and mentally appeared about 4 to 5 years of age. He had 20 good teeth, the first having been cut at the age of 2 years. His appetite was poor. On April 22nd he developed pertussis. This induced convulsions, once on April 24th and four times on the 25th, and was followed by general bronchitis. On admission on March 25th he weighed 15 lb. 12 oz., and on April 20th he had gained 28 oz. Since then the pertussis and bronchitis had caused loss of weight. The Wassermann reaction was negative. There appeared no special cause for his backward development beyond malnutrition and unsuitable feeding during early life. He had been taking polyglandin and improved, but the improvement may have been due to food and nursing.

Dr. W. MITCHELL SMITH showed a case of Giantism in a girl aged 12 years 9 months. Family history: Patient was the seventh of ten pregnancies; two miscarriages; five died at or soon after birth; three living and well; brother, aged 20 years, height 5 ft. 9½ in., weight 16 st.; a brother, aged 11 years, normal; and present case. Father suffered from diabetes; once 17 st., now 14 st. Mother healthy. Maternal grandmother reputed to be 32 st. at time of her death. Present condition: Height, 5 ft. 4½ in.; weight, 17 st. 7 lb. Very obese, with equal distribution of fat; large framework, especially across the hips. Pubic hirsuties. Menstruating regularly since last Christmas. Blood pressure 125 mm. Hg; urine normal; optic discs normal. Mentality normal for girl of her age (Standard VII.); excellent memory, placid disposition, gross eater. Skiagram of sella turcica showed that —(1) it was very well developed for a girl of her age; (2) there was no erosion of the anterior or posterior part to indicate a tumour of any size.

Dr. J. WALTER CARR showed a case of Juvenile General Paralysis in a boy aged 8 years. There was nothing in the family history to suggest syphilis, and the patient did not present any of the stigmata of the disease. He had not had any previous illness of importance. For about six months his walk had been getting increasingly jerky, and he had sometimes fallen down. For the last three months his pupils had been noticed to be unequal. Recently his speech had been getting indistinct and mumbling. Formerly he was rather bright at school, but of late had ceased to make any progress; had been unable to write, and had lost his memory. He had not had any convulsions. He was a healthy-looking, rather excessively stout boy. He showed marked mental impairment, with distinct delusions of exaltation; for instance, he talked of having knocked down a policeman and killed two Germans. He had incontinence of urine and often of fæces also. The left pupil was larger than the right and reacted very sluggishly to light; the right pupil reacted normally. The left optic disc was very considerably paler than the right. He had a distinctly spastic gait, with double ankle clonus and exaggerated knee-jerks. The triceps and supinator jerks were also increased. It was not possible to be sure whether the plantar reflexes were flexor or extensor. There was no ataxy. The Wassermann reaction of the blood was positive.

Mr. A. S. BLUNDELL BANKART showed a case of Hemihypertrophy, partly crossed, in a boy aged 6 years. Asymmetry of the face and limbs was noticed soon after birth. The condition had remained stationary, except in so far as the child had grown. The right side of the face, right half of the tongue, right thigh, and right leg were decidedly larger than the corresponding parts on the left side. The left forearm was decidedly, and the left arm was slightly, larger than the right forearm and arm respectively. Skiagrams of the forearms and the legs showed that the bones on the enlarged side were slightly thicker than those of the smaller side (?). There was no increase in length. The left testicle was slightly larger than the right.

Dr. C. O. HAWTHORNE showed a case of Double Optic Neuritis in a boy, aged 9 years, without other evidence of intracranial or nervous disease, or of disease in the thoracic or abdominal viscera. There was some degree of anæmia, but by no means extreme, and the Wassermann reaction was negative. He had been under observation in hospital for 14 days, and except for some headache on the first day he had seemed quite well and happy. Acuity of vision, 6/5 each eye. The history was of occasional attacks of headache commencing eight months ago, sometimes very severe, and in recent weeks often accompanied by vomiting. There was no admitted violence to the skull or of illness other than the above. There was a history of "consumption" in the mother's family and of "fits" in that of the father; a sister had a "tubercular knee."

Mr. E. D. D. DAVIS showed a case of Ulceration of the Soft Palate of Unusual Origin in a girl aged 13 years, who had been sent to Charing Cross Hospital by Dr. J. D. Rolleston with the history that she had been admitted to the fever hospital for diphtheria on April 14th. One week before admission to the fever hospital she complained of sore-throat, but was otherwise quite well. Cultures of the fauces showed no diphtheria bacilli and direct smears showed no Vincent's organisms. When seen by Mr. Davis on May 19th there was a large irregular ulcer involving the left half of the uvula, soft palate, and left pillar of the fauces, with considerable loss of the left half of the palate. The ulceration was atypical of lupus, tubercle, or syphilis, but the Wassermann reaction was positive. There was no other lesion of the nose, pharynx, larynx, or ear. Mr. Davis also showed a case of Lupus of the Hard Palate and Gums for comparison with the above.

Dr. CAUTLEY (for Dr. P. HAMILL) showed: 1. A case of Recurrent Jaundice. The patient, a girl aged 13 years, had been under observation since November, 1914, suffering from recurrent attacks of jaundice. From then up to the present time she had not been entirely free from pigmentation. During the exacerbations bile was present in the urine, the fæces were clay-coloured, and the liver was enlarged. In the intervals her general health was good. Since January, 1916, the spleen had begun to enlarge, and had extended more than 1 in. below the costal margin. During an exacerbation the blood count was found to be: Red blood cells, 3·78 million; white blood cells, 10,800 per c.mm.; hæmoglobin, 70 per cent.; colour index, 0·9 per cent. Differential count: Polymorphonuclears, 52 per cent., total number 5620; lymphocytes, 45 per cent., total number 4860; eosinophiles, 1 per cent., total number 100; basophiles, 2 per cent., total number 220. Very slight anisocytosis and poikilocytosis; no nucleated red cells seen. Corpuscular fragility normal. Loewi's pancreatic reaction was negative. 2. A case of Unilateral Enlargement of the Tongue. The patient, a girl aged 5 years, was admitted to hospital with unilateral enlargement of the tongue. It was with difficulty that the tongue could be retained in the mouth. The enlargement appeared to affect the right side only, and involved the floor of the mouth. The papillæ were enlarged, but did not resemble the minute vesicles commonly seen in cases of lymphangiectasis. Skiagrams did not reveal any corresponding hemihypertrophy of the cranial bones.

Mr. PAUL BERNARD ROTH showed a case of Congenital Defect of the Left Ulna in a girl aged 9 years, which was described in THE LANCET of May 23rd, 1914, p. 1457.

Dr. J. LAWSON DICK read a paper on the Teeth in Rickets.

Dr. ERIC PRITCHARD read a paper on the Rational Treatment of Rickets, with an illustrative case.

ROYAL ACADEMY OF MEDICINE IN IRELAND.

SECTION OF SURGERY.

Injuries to Peripheral Nerves.—Bullet Injuries of Nerves and their Treatment.

A MEETING of this section was held recently, Mr. ALEX. BLAYNEY being in the chair.

Major F. C. PURSER read a paper on Injuries to Peripheral Nerves. He showed first what might be expected in a nerve which was wholly divided and then sutured under

the most favourable conditions. Wounds caused in war seldom had so good an ending. They might be divided roughly into two classes—a numerically smaller class of total loss of function and a larger class where function was not wholly lost. A case in either class, but especially in the latter class, might be associated with pain or with hyperæsthesia. In the first class, with total loss of power and of sensation, the question to make sure of first was that the lesion was organic, of a nerve or nerves, and not functional. Having decided this, the exact outline of sensory loss and extent of motor loss should be recorded. If there were no improvement in six weeks or two months exploration of the nerve was justified. Partial loss of function varied in severity of its symptoms from a loss almost total to a mere subjective sense of abnormality. Motor loss, as far as it can be compared with sensory loss, is often disproportionately great. Improvement in the condition of a case may be gauged better by an exact examination of sensory changes than elsewhere. Cases were described illustrating this. Either total or partial loss of function may be due to anatomical section of nerve or to the inclusion of the nerve in scar or other compressing tissue. Recovery following secondary suture was far less satisfactory than that following the release of the nerve from scar tissue. Operation was called for when the disablement was very great, and was not lessening under proper relaxation and massage treatment, and when pain was severe. Often enough it made matters worse, and should not be undertaken without very careful repeated consideration of the case.

Mr. W. S. HAUGHTON read a paper on Bullet Injuries of Nerves and their Treatment. He dealt chiefly with the mechanical effects of high-velocity bullets striking the tissues, and described the different types of lesion that resulted in the nerves in the neighbourhood of wounds.

WEST LONDON MEDICO-CHIRURGICAL SOCIETY.—A meeting of this society was held on June 2nd, Dr. Leonard Dobson, the President, being in the chair.—Dr. J. Dundas Grant read a paper on Some Points of Practical Interest in the Diagnosis and Treatment of Diseases of the Nose, Throat, and Ear. Beginning with the subject of nasal affections, he said that a nasal discharge was sometimes simply due to eczema of the nasal vestibule, owing in part to too zealous irrigation with saline solutions; this could be cured by the cessation of irrigation, and by the use of a simple ointment. In acute nasal catarrh the sinuses were frequently involved, and various remedies were suggested. In asthma the condition of the nares should always be examined. For ozæna a very efficient method of cleansing the nose with an alkaline solution was demonstrated. Other methods of treatment were described. One form of nasal obstruction often overlooked was due to collapse of the alæ nasi. As regards throat affections, the fact that persistent hoarseness might be due to carcinoma of the larynx, necessitating immediate operation, was frequently overlooked, whereas pharyngo-mycosis, which generally disappeared spontaneously after some period, longer or shorter, caused early alarm. After discussing the various causes of stridor, dysphagia, regurgitation of food, and hæmorrhage from the mouth, Dr. Dundas Grant passed on to the consideration of vertigo and relaxed membrana tympani, and concluded by demonstrating an ingenious method of detecting simulated deafness.—Dr. Stanley Melville exhibited skiagrams as follows: (1) Cardiospasm; (2) rabbit-bone (vertebra) in right bronchus, removed by operation; (3) safety-pin in right bronchus, removed by operation; (4) spasm of upper part of œsophagus; and (5) irregular left frontal sinus.

AT the recent general meeting of the Coroners' Society of England and Wales Mr. F. N. Molesworth, solicitor, coroner for the Rochdale division of Lancashire, was unanimously elected President for the ensuing year. Dr. F. J. Waldo, coroner for the City of London and borough of Southwark, was elected Vice-President. Owing to the war the usual annual banquet was not held. The members of council were entertained at lunch by the outgoing president, Dr. Waldo.

Reviews and Notices of Books.

An Introduction to the Theory of Statistics.

By G. UDNEY YULE, M.A., Lecturer in Statistics, University of Cambridge. Third edition, revised. London: Charles Griffin and Co. Pp. 382. Price 10*s.* 6*d.* net.

THE need for a book such as this is great, as there are few of us who are able to draw reliable conclusions from the mass of statistics published; we therefore give a cordial welcome to a work that will help us to read a table of statistics intelligently, and especially to the one under notice, as it is not encumbered by abstruse mathematics.

The notation of the book is clear and simple. The attributes of an assembly are denoted by capital letters, the absence of these attributes by the corresponding Greek letters—e.g., if A denotes blindness, α denotes sight. Further, the number of cases of blindness in the assembly is denoted by the symbol (A); similarly, if B denotes deafness, the class-frequency, as it is called, of those who are both blind and deaf is indicated by (A B). Let us suppose that we are given the following statistics of a certain assembly of persons: The total number of persons examined N = 1000, of these 50 are blind, 40 are deaf, and 2 are both blind and deaf. What conclusions can we draw as to the relation between the blindness and deafness in this assembly? We have (N) = 1000; (A) = 50; (B) = 40; (A B) = 2. Now clearly (N) = (A) + (α), and similarly, if we consider only the specified universe of deaf people in this assembly, we must have (B) = (A B) + (α B). It is obvious that if A is not related to B there should be the same proportion of the B's among the A's as among the non-A's—i.e., if A and B are independent $\frac{(A\,B)}{(A)} = \frac{(\alpha\,B)}{(\alpha)}$. Similarly, $\frac{(A\,B)}{B} = \frac{(A\,\beta)}{(\beta)}$, where there is the same proportion of the A's among the B's as among the non-B's. When $\frac{(A\,B)}{A} > \frac{(\alpha\,B)}{(\alpha)}$ we draw the inference that A and B are positively associated in the assembly considered, possibly from some common cause such as syphilis. In the case given we must compare—

$$\frac{(A\,B)}{(A)} \text{ with } \frac{(\alpha\,B)}{(\alpha)} \text{ or } \frac{(B)-(A\,B)}{(N)-(A)}, \text{ i.e. } \frac{2}{50} \text{ with } \frac{38}{950} \text{ or } \frac{2}{50}$$

$$\left(\text{or similarly, } \frac{(A\,B)}{(B)} \text{ with } \frac{(A\,\beta)}{(\beta)}, \text{ i.e. } \frac{2}{40} \text{ with } \frac{48}{960} \text{ or } \frac{2}{40}\right)$$

As the two ratios are equal in this case we conclude that A and B are independent in this assembly, and hence we might say that probably it was not an assemblage of syphilitic patients.

There are one or two warnings that must always be borne in mind: (1) that "Association cannot be inferred from the mere fact that some A's are B's, however great that proportion" (p. 29); "the mere fact that ..... 99 per cent. of A's being B implies nothing as to the association of A with B; in the absence of information we can but assume that ..... 99 per cent. of α's may also be B's" (p. 39); (2) the conclusion drawn refers only to the assembly examined; no general conclusion can be drawn from such a small number as 1000. Now if we denote vaccination marks by A and small-pox by B we shall find $\frac{(A\,B)}{(A)} < \frac{(\alpha\,B)}{(\alpha)}$. This clearly shows that the vaccinated are less liable to small-pox than the unvaccinated, or that there is a negative association between vaccination and small-pox. But the opponents of vaccination contend that this does not necessarily imply a protective effect of vaccination, but that it is due to the fact that most of the unvaccinated are drawn from the lowest classes, living in very unhygienic conditions. Of course, if statistics were taken from a section of the population living under the same hygienic conditions (whether good or bad) this contention could be proved false. When an association between A and B is found, we cannot infer that the relation is a direct one; it may be due to an association of C with A and C with B, where C has not been noted in the tables (as syphilis has been suggested above).

The reader may meet with some difficulty in following the chapter on Association and some of the subsequent pages, since the equations which are true when A and B are independent, are applied to cases where there is a relation between A and B. For instance if, and only if, A and B are independent, or—

$$\frac{(A\,B)}{(B)} = \frac{(A\,\beta)}{(\beta)},$$

$$\frac{(A\,B)}{(B)} = \frac{A\,B + A\,\beta}{(B) + (\beta)} = \frac{(A)}{(N)}.$$ (Similarly it may be shown that $\frac{(A\,B)}{(A)} = \frac{(B)}{(N)}$)

$$\therefore \quad A\,B = \frac{(A)\,(B)}{(N)}$$

It is quite true, as stated in the book again and again, that A and B are independent if $\frac{(A\,B)}{(B)} = \frac{(A)}{(N)}$, and that they are positively or negatively associated if $\frac{(A\,B)}{(B)} \gtrless \frac{(A)}{(N)}$. But in this last case the difference between $\frac{(A\,B)}{(B)}$ and $\frac{(A)}{(N)}$ is less than the difference between $\frac{(A\,B)}{(B)}$ and $\frac{(A\,\beta)}{(\beta)}$, as, indeed, is pointed out on p. 31. In this case one is advised to use the correct ratio $\frac{(A\,\beta)}{(\beta)}$ rather than the approximation $\frac{(A)}{(N)}$ to show the considerable positive association between A and B. The figures noted for this special case are—

$$\frac{(A\,B)}{(B)} = \cdot 70 \qquad \frac{(A)}{(N)} = \cdot 67 \qquad \frac{(A\,\beta)}{(\beta)} = \cdot 40\,;$$

and clearly the difference between ·70 and ·40 is much greater than that between ·70 and ·67. The reader is afterwards surprised to find that the measure of the association and the Mean Square Contingency Coefficients are all based on the difference between (A B) and $\frac{(A)\,(B)}{(N)}$. This is obviously based on the difference between $\frac{(A\,B)}{(A)}$ and $\frac{(B)}{(N)}$, or between $\frac{(A\,B)}{(B)}$ and $\frac{(A)}{(N)}$, which is shown to be faulty. In the next edition it is to be hoped that this difficulty will be cleared up. The rest of the book dealing with frequency distribution, measures of dispersion, correlation, the theory of sampling, &c., is too technical in its nature to discuss profitably in a review. We have only noted one misprint—(a B) (a β) for (a B) (A β), on p. 28.

In conclusion, we heartily congratulate the author for producing a book that should be of great value to biologists, and all students of economics and vital statistics.

The Pathology of Tumours.

By E. H. KETTLE, M.D., B.S. Lond., Assistant Pathologist and Lecturer on Pathology, St. Mary's Hospital Medical School. With 126 illustrations. London: H. K. Lewis and Co., Limited. 1916. Pp. viii. + 224. Price 10*s.* 6*d.* net.

THE subject of tumour formation still remains one of the most enigmatic in the whole field of pathology, in spite of the concentration of research directed to its elucidation in nearly all countries. It is therefore one of special interest to the pathologist, and at the same time of great practical importance to the practitioner who desires to keep in touch with the results of recent research, and to apply them in so far as they afford suggestions for prevention of the disease and for the improvement of treatment. Dr. Kettle in the book before us has collected and summarised the general information at present available upon the subject of tumours in a very satisfactory manner. His book is of convenient size, succinct, and yet readable. The established facts he presents in a clear and intelligible manner, while his account of theoretical or speculative considerations is incisive and critical.

He has divided a short book into three parts, the first dealing with the general biology of tumours, the second with their general pathology, and the third with special pathology. In the first part the structure and growth of tumours are dealt with, with special reference to the questions of innocency and malignancy. The author discusses the modes of dissemination of malignant tumours, and refers at some length to the process of permeation as described by Sampson Handley. His presentation of the main theories put forward to explain the origin of tumours is brief, but perfectly concise and critical. One of the best divisions of this part is that dealing with the experimental study of cancer, in which a clear account is given of recent work upon the study of transplanted tumours in animals. The second part begins with a consideration of questions of terminology and classification. The classifications of Powell White and Adami are given at length, but for use in this book the ordinary histological nomenclature is adhered to. The innocent connective-tissue tumours are first described, then the sarcomata, next the innocent epithelial tumours and the carcinomata. The following groups are then considered separately—endotheliomata, hypernephromata, melanomata, and teratomata. The descriptions given are in each case clear and easy to follow. They are also illustrated by reproductions of microscopic sections, for the most part from specimens observed by the author. The third part is devoted to the special pathology of tumours, which are considered according to their regional incidence. This part is also well illustrated and conveniently arranged.

We have every confidence in recommending Dr. Kettle's work as a convenient and useful handbook for the practitioner and the student. It possesses a useful index, rendering reference to any particular point easy.

LIBRARY TABLE.

Twelve Lectures on the Modern Treatment of Gonorrhœa in the Male. By Dr. P. ASCH (Strassburg). Translated and annotated by F. E. GARDNER, M.D., Lecturer, New York Polyclinic. London: W. Heinemann. Pp. 104. Price 5*s.* net.—This is a small compact volume containing a series of 12 lectures on the modern treatment of gonorrhœa and covering all the essentials of an important subject which still receives too scant attention in English surgical text-books. A chapter of special value deals with abortive treatment and the methodical treatment of acute gonorrhœa by irrigation, with details of the necessary technique. A good account is given of the selection of suitable cases for treatment, of the risks that may be encountered, and how they are to be avoided. Common complications, such as prostatitis, orchitis, and cystitis, are adequately described, as well as the treatment by urethroscopy and lavage. The book is essentially practical and can be recommended to those who, without much previous experience of the disease, are now called upon to treat it.

Orthopædic Surgery. By EDWARD H. BRADFORD, M.D., Professor of Orthopædic Surgery Emeritus in Harvard University; and ROBERT W. LOVETT, M.D., Professor of Orthopædic Surgery in Harvard University. Fifth edition. Profusely illustrated. London: Baillière, Tindall, and Cox. 1916. Pp. x. + 416. Price 15*s.* net.—This edition of a well-known text-book differs very little from the last issue, which was noticed in THE LANCET of Nov. 2nd, 1912. Except for a few additional paragraphs on syphilis and on the Abbot treatment of scoliosis, the text is hardly altered. Of the 369 illustrations, however, 21 are new and 12 of those in the last edition have been omitted. As we have said before, the book is a useful practical guide to the treatment of deformities and diseases of the bones and joints. It makes no pretentions to be a complete treatise and is in no sense a rival to such a work as Tubby's "Deformities," but the fact that a fifth edition has been called for so soon after the appearance of its predecessor is evidence of its acceptability to the medical public.

Notes on Galvanism and Faradism. By E. M. MAGILL, M.B., B.S. Lond. London: H. K. Lewis and Co. 1916. Pp. xvi.–220. Price 4*s* 6*d.* net.—This small handbook is meant to serve as an introduction to a difficult subject. It is mainly intended for masseuses preparing for their qualifying examinations. The author has a style whose lucidity is useful in explaining electrical principles that prove puzzling to most beginners, and it is probable that a good many individuals with higher aims than the masseuse would derive benefit from a study of this book. All the ordinary types of apparatus are described and their proper use explained, but the illustrations are reproduced almost wholly from the catalogue of one manufacturer. Special care has been taken

to teach how electrolytic burns may be avoided, and the proper treatment is indicated when this very undesirable accident arises. Apart from galvanism and faradism, the use of the alternating current and static electricity is dealt with, and there is also a chapter on the use of radiant heat. The book seems to be well adapted for the purpose for which it has been prepared.

The Structure of the Fowl. By O. C. BRADLEY, M.D. Edin. London: A. and C. Black. 1915. Pp. 153. Price 3*s.* 6*d.* net.—This quite short handbook is intended less for the student of comparative anatomy than for the agriculturist, whose business demands some knowledge of the domestic fowl in health and disease. But it is nevertheless an entirely trustworthy guide to the more scientific reader who desires to preface a wider acquaintance with bird anatomy by the salient facts of this study; for all the essential details, even histological, are given with abundant illustrations of a simple and easily intelligible kind. The author in his preface places candidly before us the difficulties which he experienced in determining what to leave out in a necessarily short treatise. But we have found no conspicuous lacunæ in what should prove a very handy *exposé* of the principal features of bird anatomy.

JOURNALS.

The Quarterly Journal of Medicine. Edited by WILLIAM OSLER, J. ROSE BRADFORD, A. E. GARROD, R. HUTCHISON, H. D. ROLLESTON, and W. HALE WHITE. Vol. IX., No. 35. April, 1916. Oxford: At the Clarendon Press; London, Edinburgh, New York, Toronto, and Melbourne: Humphrey Milford. Subscription, 25*s.* per annum; single numbers, 8*s.* 6*d.* net each.—The contents of this number are: 1. An Experimental Investigation on Diarrhœa and Vomiting of Children, by Edward Mellanby. This paper is a record of some interesting and suggestive observations on experiments undertaken to elucidate the pathology and treatment of diarrhœa and vomiting in children. The substance chiefly investigated is the active and toxic one β-imidazolylethylamine, which, it is known, can produce diarrhœa and vomiting, a fall of blood pressure, depression of the respiratory centre, and coma. Among the chief conclusions arrived at are: That there is a marked delay in the absorption of toxic substances normally in the intestine, such as β-imidazolylethylamine, when animals are injected with large quantities of fluid; that water in the intestines delays the absorption of toxic substances, as also does the digestion of foodstuffs and the presence of bile in the intestines. It was also found that the resistance of the animal to the action of toxic substances is very greatly increased by the injection of fluid into the circulation, and conversely that an animal with a diminished amount of fluid, particularly after the loss of a small amount of blood, has little power of resistance against toxic substances; that an animal's resistance is greatly increased after it has absorbed food, particularly meat, from the intestine. Dr. Mellanby points out how susceptible the body is to loss of fluid, and suggests that in the light of his experiments a child suffering from diarrhœa and vomiting is in an ideal position to allow toxic substances, normally present in the alimentary canal and its mucous membrane, to be absorbed rapidly and exert their full toxic action. He suggests further that the important essential in treatment is to get the volume of the body fluids of the child back to, or above, normal.—2. The Quantitative Determination of Amylase in Blood-serum and Urine as an Aid to Diagnosis, by Percy Stocks. Some important conclusions are arrived at, notably that an amylolytic ferment is present in the blood-serum and urine of all healthy individuals, and that the amount is practically constant in the blood-serum, that in the urine being subject to diurnal variations due chiefly to the digestive functions. The ferment is derived from the pancreas and is absorbed directly into the blood. The ratio of the amount in the blood to that in the urine, calculated on the total daily excretion, may be disturbed where there is renal insufficiency or where there is severe passive congestion. With these exceptions any increase of the ferment in the blood-serum denotes pancreatic mischief. The highest values found were in a case of acute pancreatitis. Dr. Stocks is of opinion that the estimation of the amylolytic capacity of the blood-serum and the urine is a most delicate and reliable test for disease of the pancreas.—3. Urticaria Tuberosa of Willan, by J. A. Nixon. A historical survey is given of the literature upon this condition, with a general account of its clinical characters and a description of five cases. The importance of distinguishing the condition from rheumatoid arthritis is emphasised, and the effects of treatment are given.

Annals of Tropical Medicine and Parasitology. Vol. X., No. 1.—Dr. H. Harold Scott, Government bacteriologist, Jamaica, contributes to this number an interesting report of his study of the so-called "vomiting sickness" of that island. The nature of this illness has hitherto remained obscure, but Dr. Scott's detailed investigations show that it is an intoxication produced by partaking of a decoction of the ackee fruit, an article of diet in common use at a certain season of the year among the negro population of Jamaica, the tree being found in many of the gardens of the lower-class inhabitants. The ripe fruit before use is boiled with yams, salt fish, or other substances, the soup, or pot-water, being given to the children, while the more solid contents are consumed by the adults. Under certain circumstances the ackee fruit becomes poisonous, and the toxic matter is readily extracted by boiling water. Children are the usual victims of the illness, which is very fatal. The tree, though common in Jamaica, is seldom found in any other of the West Indian Islands, and it is noteworthy that in none of them does "vomiting sickness" occur. In THE LANCET of Oct. 30th, 1915, we drew attention to this subject, the Governor of Jamaica in his annual report for the fiscal year 1914–15 having referred to Dr. Scott's preliminary investigations.—In a paper entitled "Ankylostomiasis: Simplified Diagnosis and Treatment," Dr. G. Duncan Whyte, of Swatow, places on record what he regards as a simple and reliable test for determining the presence of ankylostomes in a patient, and also a method which he has found to be of great help in carrying out the treatment of this disease.—The Value of Differential Blood Counts in the Diagnosis of Malaria is discussed by Captain E. Randolph Armstrong, I.M.S., whose three main conclusions are that (1) the increase of large mononuclear leucocytes found in malarial bloods is a fairly persistent change; (2) this change of ratio, evidenced by a differential count, is sufficiently specific to form a reliable test of infection; and (3) the phenomenon persists after the time when parasites disappear from the blood-stream (i.e., when parasites are no longer discoverable by practical microscopy) and so permits of a post-febrile diagnosis being made.—Mr. Henry F. Carter, F.E.S., describes three new African midges, all of them members of the family Chironomidæ and referable to that section, the sub-family Ceratopogoninæ, which contains the great majority of the biting or blood-sucking midges at present known.—Further work on the reduction of the alkalinity of the blood in cholera, and sodium bicarbonate injections in prevention of uræmia, are subjects discussed by Sir Leonard Rogers, whose observations have shown that the alkalinity of the blood is nearly always very much reduced in severe cases of cholera, and that the early and repeated administration of sodium bicarbonate intravenously has lowered the mortality from uræmia to one-fourth of its former rate.[1] It is now clear to Sir Leonard Rogers that the rule he had adopted is a sound one, and one which should never be neglected—namely, to give alkalies intravenously in all cases of cholera with each saline injection after the first, as well as with the first injection in late admissions with deficient urinary secretion. As a supplement to this paper Mr. Satis Chandra Banerjee, L.M.S., contributes a note on the technique of the estimations of the alkalinity of the blood.—A very interesting article on Immunity to Yellow Fever is furnished by Assistant Surgeon-General H. R. Carter, of the United States Public Health Service. In it is discussed whether the immunity acquired by an attack of yellow fever is permanent or only temporary, the question of human carriers in this disease being also considered. The conclusion of the author is, after many years' study and practical experience, that for all administrative purposes the immunity conferred by an attack of yellow fever may be regarded as being permanent, and that recurrent attacks, infective to the insect-transmitter, Aëdes calopos (stegomyia), do not occur. The evidence against the existence of human carriers in this disease is, in Dr. Carter's opinion, even stronger than that against the occurrence of secondary attacks.

[1] THE LANCET, July 31st, 1915, p. 221.

THE LANCET.

LONDON: SATURDAY, JUNE 17, 1916.

Hospital Sunday, 1916.

ANOTHER year of the great war is drawing near its close, and on Sunday, June 25th, for the second time since the long-drawn and stupendous struggle began, the Metropolitan Hospital Sunday Fund will appeal to the generosity of London and of the nation. At the first glance it may seem an inauspicious occasion upon which to press the claims of institutions associated in the minds of us all with the relief of the working classes in sickness or in injury, suffered when pursuing their normally peaceful avocations. But, as a matter of fact, in no year since hospitals have existed in London has their claim been stronger upon the public gratitude, and in no year has their need been greater or more obvious to all. It is a claim which, beyond all others, should be ignored by none in the places of worship in which it will be heard, and by none of those prevented by circumstances from attending divine service upon the day appointed. The Fund has met with generous support before. We have ourselves appealed on its behalf in years of peace and prosperity, in leaner years when trade was declared to be bad and money scarce, and in those years, which seem long ago, when the cloud of the South African War was dark above this country. To-day an infinitely denser shadow hangs over all the world, and we are appealing to the general public, not to the narrower circle of our usual professional readers, to remember all that our hospitals have done and are doing to lighten that shadow. We ask our readers to realise that the difficulties, which they may be feeling financially, fall with double and treble weight upon the institutions for which they should find alms on Hospital Sunday. The war has depleted the personnel of these charities, has filled their wards to overflowing, and has raised for them, as for everyone, the price of every kind of supply and service. Prices indeed for them have risen in many respects more than for the lay public who, when in health, are not affected by the scarcity of drugs or of those descriptions of food most desirable for the sick and injured. It is not the abnormal costliness of wonted personal luxuries which causes anxiety in hospitals. Their expenditure is upon things necessary for the lives of others.

When war broke out, the army of 160,000 men which our country had prepared for the remotely possible contingency of continental service, suffered severely in its first encounter with the enemy; the hospitals of London opened their doors to the first wounded that arrived in the metropolis, and those doors have stood open ever since. Military hospitals have been established by scores since those early days to meet the needs of armies not of hundreds or of thousands but of millions of men; yet to the full extent of their capacity the civil hospitals of London, general hospitals and specialised institutions alike, have treated soldiers and sailors for the wounds and diseases which war has inflicted on them. Meanwhile the organisation of the new military hospitals with promptitude and speed in the midst of war has been rendered possible by the knowledge and experience gained in time of peace in those institutions for which the Metropolitan Hospital Sunday Fund asks support. It is from their staffs and from those trained in their schools that surgeons and physicians have been gathered to form new staffs for hospitals, which less than two years ago were not dreamt of. From the same sources were drawn nurses fitted by years of hospital training to take their part in tending the wounded and in instructing the untrained women who came forward to share the task. We have been referring to hospitals at home rather than to those nearer the seat of war. But what of the work done not only in France and Flanders, but in Eastern Europe and in Africa, by men and women trained in our great voluntary hospitals? What of those who have tended, not their wounded and sick countrymen only? French and Italians, Belgians and Serbians have alike reason to be grateful to British surgeons and nurses, and the proportion of those who directly or indirectly owe their training and efficiency to a metropolitan hospital is very high. But while the Metropolitan Hospital Sunday Fund addresses itself for this reason to the whole public, and while its collections are held beyond London and the suburbs, it is mainly from these that it draws support. It appeals to no class in time of peace, but to the charitable of all classes. Now in time of war it solicits assistance from all classes alike, and not least from those who have had wounded friends or relatives restored to them by surgical and medical skill acquired in British hospitals. These in themselves would constitute a vast body of contributors, while those whose relatives have served against the enemy and escaped all injury and all disease will recognise that their indebtedness is as great, while they consider the records of past wars in which disease has accounted for more deaths than shot and shell. Let them recall the death-roll due to typhoid fever alone in the South African War, and remember that wherever this fell enemy has been fought and kept at bay among our present armies it has been with weapons forged in the pathological laboratory by men trained in our hospitals in time of peace.

At the same time, if it behoves all to think of the hospitals of London with gratitude for what they have done in the present time of war and for the profit which the nation is deriving from their patient work during years of peace, we must not

forget that it was for usefulness in peace that they were designed, founded, and supported in the past. They are there to relieve suffering among the civil population no less than they were before, and the need of the civil population for their aid is not lessened by war. Our industries continue, though dislocated and diverted in many instances in order that the needs of the army may be supplied. The younger men have gone, but the older and weaker men and the women and children remain, a great number of women having taken the places of men in operations in which accident and disablement from various causes are apt to occur. The work done for those directly the victims of war is in addition to, and not in substitution for, the hospitals' normal functions. Let us not then, even though war charities rightly claim our attention, neglect the obligation of benevolence in other directions. Let us rather remember that the hospitals are still working amidst difficulties even greater than those to which they are accustomed, and performing their normal tasks with revenues more insufficient and more precarious than before. The future is uncertain. The hospitals desire to face it with no burden of debt to hamper their energies in the future, but "war-time economy" with them is not a matter of retrenchment involving self-denial. Their normal life is regulated with the strictest frugality, and the only method of saving open to them is to reduce the number of the patients whom they treat. This, we all hope, they will never be compelled to do, for the demand for their aid increases as London grows. Hope, however, without active intervention will effect nothing, and within a few days the Metropolitan Hospital Sunday Fund will afford an opportunity for all to intervene. The appeal is to all, without distinction of rank or wealth. The richest and the poorest can give according to their means, and many of the latter will be rewarded by the feeling that they are making part repayment of a personal obligation. The indebtedness of the public to the hospitals has never been greater than to-day.

Fighting the Fly.

WITH the return of the summer the fly comes into its heritage and, unless it is to be left in undisputed possession, much time and thought must be given to the means for dealing with this pest and its attendant evils. In winter under a low average temperature the house-fly breeds with difficulty and even its usual mode of survival, whether as pupa or fully-formed insect, is still a matter of discussion. The view more generally held is that the adult fly survives the winter in warm unswept corners, and more than this, Professor F. M. HOWLETT demonstrated quite recently in the "fly-room" of the Imperial College at South Kensington that the house-fly can continue to breed in an ordinary room during the winter months. But on the other side of the Atlantic many years of observation have led Dr. L. O. HOWARD to the belief that it is the pupa which usually survives. However this may be, as soon as the warm weather returns the fly seeks out the dung-heap and the dust-bin wherein to lay eggs; the eggs soon hatch out, the whole life-history of the maggot is accomplished in a couple of weeks, and generation follows generation until the kitchens and messes of camps and the dwelling-rooms of the poor swarm with the unsavoury brood. Many measures have been suggested and tried for meeting the evil, some applicable to one stage of the fly's life-history, some to another. To tap the supply at its source and to destroy all the hibernating larvæ and insects by one great campaign would at first sight seem to be the measure most deserving of effort, but for this purpose the winter habitat must be accurately known, and, as we have seen, this information is not yet ours. Short of this, the larvæ may be destroyed in their breeding-grounds before they have become a source of danger to the community. Or, when the breeding cannot be, or has not been, controlled, the adult fly may be trapped or poisoned; if not killed it may be prevented from reaching offal and excreta and so becoming infected, or from settling on food and on the helpless infant and sick person, and passing on to them the infective material which it has collected.

In rural districts the excreta of horses and cattle so greatly exceed in quantity the other breeding-grounds of the fly that the manure-heap is the principal object to be dealt with. In England farms are for the most part scattered evenly over the country, and there is no great accumulation of manure from this source; in rural France human life is all concentrated in the villages, each house in the village is a farm and has its own manure-heap, and the dwelling rooms are therefore in August black with flies which are accepted as the ordinary gift of summer. At the present time, too, not only the normal rural inhabitant but the whole population of military camps at home and abroad is exposed to inconvenience and risk from this source. Manure is too valuable a product to be lightly destroyed, and means must be sought to secure the destruction of the larvæ without spoiling the fertilising properties of the manure itself. A simple and effective method is to surround the manure-heap with a ring of dry straw into which the mature larvæ migrate to pupate, when they can be swept up twice a week and cremated with the straw. In a recent publication[1] Professor R. BLANCHARD, of Paris, summarises the various chemical agents which have been employed for this purpose chiefly in America. Chloride of lime is efficient, but makes the manure unusable. Borax kills the larvæ apparently without damaging the manure, but is expensive and still upon its trial. Professor BLANCHARD himself favours a mechanical method, which also comes from America, in which the manure is raised on a platform above a shallow concrete basin. Water is pumped periodically upon the pile to favour fermentation, and to avoid the moist fermenting stuff the larvæ migrate from the pile, fall into the basin, and are drowned. An

[1] La Lutte contre La Mouche. Par Professor R. Blanchard. Ligue Sanitaire Française, Bulletin No. 5. Paris: 72, Rue de Rome. Price 2 francs.

overflow from the basin leads into a pit whence the water is pumped, and this becomes at the same time a valuable source of liquid manure. A physical method of destruction was touched on by Lieutenant-Colonel S. M. COPEMAN in an interesting paper in the last issue of THE LANCET. Whilst experimenting with the lethal effect of tetra-chlor-ethane on the larvæ in a tightly packed heap, Colonel COPEMAN found that the larvæ were also dead in a control heap to which the chemical had not been applied. He then directed his attention to the temperature in the interior of the manure-heap, and found it to average 70° C. in the first few days after the heap had been made, and at the end of a fortnight to be still in the neighbourhood of 60° C. Professor HOWLETT undertook an inquiry as to the lethal temperature for fly larvæ and he was able to state that they would hardly survive long at a temperature above 41° C. Here, then, is the basis of a purely physical method of dealing with the larvæ, simple and inexpensive. Colonel COPEMAN believes that the close packing has no deleterious effect on the fertilising power of the manure, and this, if confirmed, constitutes a further recommendation for this method.

The problem of dealing with the larvæ naturally varies according as the neighbourhood is an urban or a rural one. In urban districts where there is little storage of horse manure and human excreta are carried away by water, the fly-breeding principally takes place in the domestic house refuse, and it is the decaying remnants of food, animal and vegetable, to which attention must be directed. In the ideal household there is little waste, nothing that can be used as food for man or flies is thrown away, and any organic residue is burned, leaving only the dry ash to be removed. This is the end to be aimed at, both in peace and war time, but especially now that economy in food is one of the citizen's first duties. Frankly, it is hardly to be hoped that such home destruction of organic matter can be complete; gas-cooking makes it more difficult. The dustbin and sanitary pail will still contain material to attract the fly and suitable for fly-breeding. There is now the choice between preventing the fly's access to this material by means of well-fitting covers, or allowing the fly to lay its eggs and then removing the material for cremation before the larvæ have had time to mature. A recent writer, Mr. G. H. HARDY, has advocated the latter as the better method, since the female fly, if allowed to lay in the bin or pail, will do so in preference to other localities in the house or its surroundings. The resulting brood then meets its certain doom at the hands of the municipal authority which collects the house-refuse not less frequently than twice a week. To make assurance doubly sure the scheme may go further and provide the pail lids with a trap whereby the flies may enter and not escape to carry particles of filth into the house again. On one or other of the very varying lines of policy advocated we trust that success will be achieved and the breeding of the fly checked.

Medical Practitioners and the Military Service Acts.

WE publish this week a copy of a circular letter addressed to all members of the medical profession by Sir ALFRED KEOGH, Director-General of the Army Medical Service, in which he draws attention to the particular provisions of the Military Service Acts, and of the Regulations made thereunder, which concern the medical profession. A memorandum is enclosed with this letter setting out the terms of the national organisation of the medical profession in relation to the needs of the navy, the army, and the civilian population, and the document, which will be found on p. 1237 of this issue, should clear up the difficulties in which many of our readers have found themselves.

Annotations.

"Ne quid nimis."

THE PETROL CENSUS.

ON or before Tuesday, June 20th, every medical practitioner "using or keeping motor spirit for the purpose of supplying motive power to motor-cars and motor-cycles kept for the purpose of his profession," is required to make a return stating (1) his registration number; (2) whether he keeps a motor-car or a motor-cycle; (3) his average consumption of motor spirit per month during the three months ending April 30th, 1916; (4) his present stock of motor spirit; (5) his estimated requirements of motor spirit per month until the end of 1916; and (6) the purposes other than professional for which he uses his car. Failure to make the return is not only a summary offence against the Defence of the Realm (Consolidation) Regulations, 1914, but, in case it is found necessary to restrict the sale of petrol or other motor spirit, any person liable to make a return and who fails to do so will be unable to obtain further supplies. The prescribed form for making the return can be obtained at any money order office in the United Kingdom, and the particular form prepared for medical practitioners is known as Petrol Form 2. Other forms have been prepared for other classes of users, but with these we are not concerned at the moment. Whether taking stock of petrol, which ought to have been done months ago, will have any appreciable effect in removing the harassing conditions under which country practitioners at present obtain their supply—and some of them can obtain no supply at all—is doubtful. Much to the point was the letter sent out to garage owners last week by the Petrol Subcommittee, in which an attempt was made to regulate the priority of the supply of petrol according to a classified list. In this classification it is an encouraging sign to see that the requirements of medical practitioners are placed immediately after the essential requirements of the Government and the carriage of munitions and the materials for munitions of war, and before the requirements of fire-brigades, ambulances, police, and local government authorities, and all commercial and pleasure cars. This is as it should be; but the classification will be of little use if the

Committee does not take steps to control the distribution of the spirit, and thereby to ensure that medical men, in view of their attenuated numbers and their great responsibilities, can get from local dealers a supply up to the limits of the requirements stated on their returns.

THE FOOD-SUPPLY OF THE GERMAN PEOPLE.

MUCH has been written and more said about the sources of food-supply available to the Central Powers when cut off by war conditions from a large part of the usual external supplies open to them in peace-time. The view has found free expression in this country that a condition of real want, more or less slow, will be the inevitable result of this isolation. On the other hand, we have seen how Dr. Eltzbacher and his collaborators reviewed the situation soon after commencement of hostilities, and claimed that by the application of scientific methods the problem could be solved—with a restricted and altered diet-sheet it is true, but still solved. The article by two of the best known of these collaborators, of which the third and concluding part appears in this number of THE LANCET, takes the matter one stage farther. Dr. Kuczynski and Dr. Zuntz admit that some but not all of the methods which they desired for safeguarding the food-supply were taken in the first winter of conflict, and attempt to show how the lost ground could be made up for 1915 by care and yet more elaborate methods. The article is frankly critical of the German administration and was evidently not written for foreign consumption. We commend it to all serious students of food problems.

COMPULSORY NOTIFICATION OF VENEREAL DISEASE IN SWEDEN.

IN one of the appendices attached to the report on proposed legislation against venereal disease in Sweden, to which we have already referred, is a paper by Dr. Sederholm, whose views on certain aspects of these problems do not coincide with those of his colleagues on the Board of Health. He is of the opinion that venereal disease should be notifiable, as it is already to a certain extent in Sweden, and that the campaign against this evil should be carried on as energetically as against the acute infectious diseases, tuberculosis and alcoholism. But, he admits, the compulsory notification of venereal disease is attended with far greater difficulties than that of other infectious diseases. As in the case of leprosy and tuberculosis, the victims of venereal disease greatly dread the publicity that a badly administered system of notification would cause. A further barrier to the success of notification is the complicated problem of prostitution. In the country districts prostitution plays a relatively insignificant part in the spread of venereal disease; and here, where every man knows his neighbour's business and mode of life, compulsory notification might speedily lead to the detection of the source of infection and to systematic treatment. In the large towns, where the spread of venereal disease is intimately connected with prostitution, the problem is far more complicated. The patient often does not know the name and address of the person from whom the disease has been contracted, and for obvious reasons he may be unwilling to help the authorities in tracking down the source of infection. And here Dr. Sederholm sees in the regulation of prostitution a way out of the dilemma. Regulation has been conducted in the past under the supervision of the police, and is, he admits, a faulty measure from legal, social, and ethical points of view. As it now exists in many parts of Sweden it is deplorably ineffective, as well as open to grave abuses. But by a transfer of regulation of prostitution from the police to the sanitary authorities, by the careful avoidance of all publicity in connexion with notification, and by the education of the public in general, and of the subjects of venereal disease in particular, as to the nature of this disease, Dr. Sederholm anticipates an appreciable reduction of the incidence of this disease, all the more because of the recent advances in its early diagnosis and treatment. It is, however, evident that before new legislation is adopted in Sweden in connexion with venereal disease, great efforts will be made in many quarters to oppose alterations in the present system, faulty though it be, as in Sweden there is a strong "abolitionist" feeling against regulation in every form.

THE CULTIVATION OF MEDICINAL HERBS.

THE efforts to foster the cultivation of medicinal herbs in this country are deserving of every encouragement if they can be shown to be shaping towards practical ends. It has been suggested that florists whose trade has been injured by the war should take up the cultivation of medicinal herbs in order to compensate themselves for their loss. This is a sensible view, but quite apart from and quite above this consideration it is desirable that we should no longer be dependent on Central European sources for any drugs which can profitably be produced at home. We have recently had an opportunity of examining a collection of medicinal plants and their dried products shown by Mrs. M. Grieve, F.R.H.S., at the Women Workers' Exhibition at Knightsbridge.[1] This collection included balm, filix mas, valerian, aconitum, and the English lavender, for all of which, we understand, there is a demand at the present moment, while it gave indications of the plants which could be successfully grown by florists in substitution for their more decorative wares, and at the same time demonstrated the possibility of producing fine specimens of crude drugs in this country. But something more is required than the mere demonstration of successful individual efforts if we are to compete seriously with the countries of Central Europe in the production of drugs. The whole question of the cultivation of plants and the facilities for preparing the drugs in pharmaceutical form will have to be scientifically considered in all its bearings, and extended trials will have to be made before it will be possible to gauge whether the industry can be established on a commercial basis. The cost of cultivation, gathering, and drying of the herbs as compared with the yield of the alkaloids and active principles are among the important considerations which will have to be investigated, and there is also the question of suitability of soil and climate. Belladonna is a weed in this country, but the cost of extracting its alkaloid would weigh heavily against the cost of cultivation. English lavender will grow to perfection with little trouble on English soil, but many other components of the materia medica require much care and labour if they

[1] Mrs. Grieve is responsible for a School of Medicinal Herb Growing at The Whins, Chalfont St. Peter (Bucks), where pupils are trained to be teachers or market growers.

are to be brought to perfection, while the failure of such a crop might easily be more costly to the grower than the failure of a crop of vegetables or flowers. Here, again, there is much room for trial and experiment, and it is possible that even in medicinal herb-growing some sort of balance may be obtained by cultivating the plants in such a way that should one crop fail another may take its place. Fox-glove, lily of the valley, and Solomon's seal are examples of plants possessing similar principles, and it is unlikely that all three would fail in the same year. If cultivation on a large scale should prove satisfactory a wide field would be open for research work, but the Government would have to subsidise laboratory workers for the purpose. That valuable therapeutic agencies hitherto undiscovered lie hidden in the tissues of plants is almost certain. Medicinal folk-lore is bound up with much superstition and fancy, but from time to time the "old woman's remedy" is found to be not wholly devoid of virtue. In the present war we have had the use of garlic revived, and there is an interesting paper on Succus Allii in the Control of Suppuration in Wounds, by Dr. A. D. S. Cooke and Mr. V. Gabriel, in THE LANCET of Sept. 11th, 1915, p. 603, while the therapeutic value of potato juice was extolled by Mr. Heaton Howard in THE LANCET of April 11th, 1914, p. 1035. These facts, we think, show a *primâ facie* case for encouraging a movement which would add to the commercial prosperity of the country and incidentally might afford suitable outdoor employment for invalided sailors and soldiers, as well as for women.

OSTEOGENESIS IMPERFECTA.

A USEFUL account of this little-known condition is given by Dr. H. C. Cameron in a paper which appears in the Proceedings of the Royal Society of Medicine[1] for last April. A living case of the disease was exhibited and also the skeleton of another patient who had died in Guy's Hospital. The causation of the disease is quite obscure, suggesting some derangement of internal secretions; it appears in early infancy and is not definitely related to defects in feeding. The condition consists in deficient ossification and consequent fragility of the long bones, with abnormalities in the development of the bones of the skull. The shafts of the long bones are curved and tortuous, and there is shortening of the limbs, more marked in the proximal than in the distal portions. Fractures result from very slight stresses; in one case the ribs gave way with distressing cracking noises whenever the child was lifted up. The fractures tend to heal and the resulting callus is laid down irregularly, an annular thickening resulting at the point of union. In the skull the fontanelles, both anterior and posterior, remain large, and there may be a persistent frontal suture. The skull bones are thin and ossification is defective, the lateral aspects of the skull remaining largely membranous. Owing to this there are bulging in the temporal regions and changes in the shape of the orbits, causing the eyes to look downwards and producing a superficial resemblance to a condition of mild hydrocephalus. There is, however, no distension of the fontanelles, and diagnosis between the two conditions should not be difficult. The bulging in the temporal regions may be so marked as to produce alteration in the position of the ears; it may be unilateral or symmetrical. In the discussion that followed the exhibit other peculiarities were pointed out, such as the "underhung" appearance of the lower jaw and the existence in some instances of continued pyrexia, suggestive of an infective condition. Skiagraphic examination of the skull bones reveals a peculiar formation, the normally continuous bones being replaced to some extent by a "mosaic" of small plates, suggesting separate attempts at ossification. A blue colour of the sclerotics was noted in the case exhibited, and may be characteristic of the disease.

[1] Section for the Study of Disease in Children, p. 43.

THE METROPOLITAN WATER-SUPPLY.

THE condition of the Metropolitan water-supply during the month of February, 1916, was influenced by the heavy rainfall of that month. The mean fall at 12 stations, selected as giving equal representation for all parts of the Thames basin, was 4·66 inches, being 2·67 inches above the average mean rainfall for that month during the previous 33 years. All the samples of water collected at the different works were clear, bright, and free from suspended matter. The results of the chemical examination of the raw waters of the Thames and Lee showed deterioration as judged by the albuminoid nitrogen, permanganate, and colour tests. New River water improved in quality, as judged by the same tests. The filtered waters improved except the East London (Lee) water as regards colour. Compared with the 1915 averages all the raw and filtered waters yielded results worse than their respective averages, except the Thames and New River in respect of the albuminoid nitrogen test. The three raw waters contained more bacteria than their respective averages for 1915, but the filtered waters, generally speaking, yielded not unsatisfactory results. Thus, whereas 95·2, 85·7, and 33·3 per cent. of the raw Thames, Lee, and New River water respectively contained typical B. coli in one cubic centimetre (or less) of water, 84·5, 52·4, and 45·6 per cent. of the filtered waters derived from these supplies respectively contained no B. coli, even in 100 times as much water—namely, 100 cubic centimetres. While the tendency, therefore, of stormy weather is to increase the impurity of the raw river water, the public supply is safeguarded by the efficient work of storage and filtration.

SELECTION FOR INSURANCE.

THE Assurance Medical Society was founded in 1893 by the late Dr. T. Glover Lyon to promote the discussion of the medical aspect of life assurance with a view of obtaining increased information and unity of opinion, and the late Dr. James E. Pollock, who gave the first presidential address, laid down that "this is not an association for the advancement and discussion of purely medical knowledge," but that a primary object of the association was to arrive at a greater uniformity of opinion as a body. In his presidential address this year Dr. Arthur T. Davies queries whether this uniformity has yet been obtained, and concludes that, although the society's records bear witness to a stock of increased information, the unity of opinion has only been achieved to a limited extent, and he suggests as a motto for the society *E diversitate unitas*. The advances in medical knowledge are ever widening the boundaries of our horizon with regard to human life and the way we view its diseases, and experienced examiners are

tending more towards the late Dr. P. H. Pye-Smith's dictum: "Reject all you must—pass all you can." No one, however, has yet been found to put into practice Dr. Pollock's idea when he said: "It might almost be stated that a money value might be assigned and a rate found for every condition of life in health and disease." Everything here depends upon prognosis, defined by Dr. Pollock as "the power of weighing evidence and applying your general knowledge to the future of individual cases," and the fact is recorded by Dr. Davies in his address that in spite of the opportunity often possessed by referees of becoming acquainted with the life of the applicant, the results of their examinations were, on the whole, less satisfactory than those made at the head office. A measure tending towards uniformity was the establishment in 1896 of a central bureau of offices to deal with deferred rejected lives, and Dr. Davies suggests that a similar inter-hospital bureau would prove of value and tend to advance medical science. We cordially agree with this view; in many departments of medicine the lack of any machinery whereby to correlate hospital experience closely is being felt.

THE INCIDENCE OF MALARIAL ATTACKS.

IN the issue of *Il Morgagni* of March 31st Dr. Luigi Facciolà seeks to prove that the incidence of malarial attacks during the year is not in accord with the supposed propagation of these fevers by means of the mosquito. In malarial districts the attacks of fever, whether primary or recurrent, are met with at all periods of the year, but their frequency and clinical characteristics vary according to the season. They occur most frequently in summer and autumn, and, according to the locality and the year, then constitute more or less severe epidemics which generally begin about the end of June or early in July and cease in November or December. These æstivo-autumnal fevers are usually primary and generally severe, such as malignant tertian and true quotidian; others are mild, such as mild tertian and quartan. During the winter the attacks, which always become less frequent in the late autumn, are usually more benign and for the most part are recurrences of those occurring in the epidemic season. In spring there is an increase in the number of cases, varying in different years, generally mild and consisting almost exclusively of mild types, such as single or double tertian, and single, double, or triple quartan, while primary severe fevers are rare and the mild types are recurrences of those occurring in the epidemic season of the year before. In summer and autumn one or two generations of mosquitoes are produced, and it is at this time, beginning from the third week of June, that a certain number of them become infected. Towards the end of summer or in autumn—September to November—many of them take refuge in dwelling-places and woods, and at the onset of the cold weather they no longer bite and the larger number of them die. Some of the females, however, survive, and with the spring, being already fecundated, leave their retreat and deposit their eggs. The maturation of the new generation into perfect insects may take place in April, or later in May and June, according to the species and locality, and shortly afterwards they begin to bite human beings and other mammals, but do not become infected until the end of June. There is thus an evident correspondence between the incidence of attacks of malaria during the year and the life and habits of the anopheles. In fact, in spring there are no infected insects, as there are only relapses of fevers of the preceding year; from the spring cases the anopheles take the specific material which, inoculated into man, initiates and develops into the epidemic æstivo-autumnal fever, and the first infected insects are only found towards the end of June, when the new season epidemic begins. The anopheles are then more numerous, and hence the percentage of those infected is also raised in the summer, when attacks are more frequent; in advanced autumn attacks of fever and anopheles decline together, and in winter the epidemic ceases because the majority of insects perish. Dr. Facciolà, however, believes that there is merely coincidence of circumstances and not correlation between these two sets of phenomena, and asks, if it be true that the mosquitoes take the germs of the æstivo-autumnal epidemic from the relapse cases of June, since they are not usually found infected before this period, if relapsed cases are scarce, and if according to Grassi it is difficult to find more than two infected out of a hundred anopheles, even at the period when malaria is most severe, how does it happen that the new epidemic in the first half of July arises in a strikingly sudden manner? Again, at the onset of winter the hibernating females which resist the cold bite from time to time, but not being then infected, how can the primary cases be explained which are sometimes met with during that season? And since during the winter only cases of recurrent æstival fever are usually seen, how is it that all through the spring mild cases continually recur? Dr. Facciolà adduces evidence to show that the theory of a prolonged incubation does not afford sufficient explanation of these phenomena, and believes, on the contrary, that it must be sought in the influence of external heat, and perhaps of some other agent which acts on the organism which is the cause of these fevers. In temperate zones, during the severe heat of summer and part of autumn, the fever becomes more virulent and produces malignant and continuous types. In winter the cold modifies it and it becomes quartan. In spring there is a slight recrudescence of cases, the so-called pre-epidemics of Celli, which, however, are mild. This behaviour and varying characteristics of malarial fevers during the course of the year are comparable with their distribution on the earth; in cold climates the almost exclusive type is the quartan, in the tropics the continuous remittent. Thus, according as the external heat is raised, either with the season in a given climate or by approximation to the equator, it renders the malarial parasites more virulent and less intermittent in their function, because they acquire greater resistance against that unknown state of the blood which determines the suspension of their activity in the apyretic intervals. In this connexion also it may be mentioned how latent germs of malaria in the body are influenced by external environment such as change of residence. This theory is claimed by Dr. Facciolà to explain the severity of the æstivo-autumnal epidemic and the mildness of that in spring. Many of the spring attacks are recurrences of the severe forms of the hot season, resuscitated and transformed into benign types by the warmth; others are recurrences of mild tertians and quartans contracted in the second half of the preceding year, or primary attacks from infection taken in the preceding æstivo-autumnal epidemic. The attacks of the æstivo-autumnal epidemic are in

the majority of instances primary onsets of latent infection in a severe form, others are recurrences of severe forms contracted in the second half of the preceding year, or severe attacks of recent infection and in a less degree recurrences of the mild attacks of the spring of the same year in a malignant form.

THE INDEX AND TITLE-PAGE TO THE LANCET: JANUARY TO JUNE, 1916.

IN view of the Government restrictions upon the supply of paper, and the shortage of paper quite apart from these restrictions, we cannot include, as usual, in all the copies of THE LANCET the Index and the title-page which are due at the end of this month. The Index and title-page will, of course, be prepared, and copies will be supplied gratis to subscribers who intimate their wish to receive them to the Manager, THE LANCET Office, 423, Strand, London, W.C. Such applications should please be sent in at once.

AT a special meeting of the Section of Surgery of the Royal Society of Medicine to be held on Wednesday, July 12th, at 5 P.M., Dr. Fred H. Albee, of New York, will give a cinematograph demonstration of his methods and technique of bone surgery, including bone grafts for Pott's disease, inlay grafts for fracture of long bones, and peg grafts for fracture of the neck of the femur.

THE Cavendish lecture will be delivered by Sir John Bland-Sutton on Friday, June 23rd, at 8.15 P.M., at the West London Hospital. The subject will be: "The Fate of Patients who have had Stones Removed from the Kidney."

THE BELGIAN DOCTORS' AND PHARMACISTS' RELIEF FUND.

A MEETING of the Central Committee of the Fund was held on June 8th, at the office of THE LANCET, when Sir RICKMAN GODLEE, the chairman of the Committee, reported the receipt, through the International Commission for Relief in Belgium and Mr. Herbert Hoover, of an acknowledgment of a cheque for £800 sent by the Committee for distribution to medical men and pharmacists in Belgium. The distribution had been made through the agency of the Aide et Protection aux Médecins et Pharmaciens Belges Sinistrés. This sum was the first of three monthly donations of £800 which it had been agreed by the Committee should be transmitted to Belgium in the manner and for the purpose described. Mr. Hoover enclosed also for the consideration of the Committee a transcript of the proceedings of the Belgian Committee, which sufficiently showed the urgent need of the money sent and the wise way in which it was allocated. The Committee thereupon decided to continue sending these monthly grants for three more months.

Professor H. G. Greenish was elected a member of the Committee, and will coöperate with Dr. Des Vœux in organising the consideration of individual cases of distress of Belgian pharmacists in this country.

The total receipts of the Fund up to June 8th were £19,250.

SUBSCRIPTIONS.

The subscriptions to the Belgian Doctors' and Pharmacists' Relief Fund received since the last list was published are as follows:—

	£	s.	d.
Dr. G. H. D. Carpenter (thirteenth and fourteenth donations—total £14)	2	0	0
Mrs. Victor Williams ...	2	2	0
South-West London Pharmacists' Association, collected by Mr. J. Krall	25	0	0

Subscriptions to the Fund should be sent to the treasurer of the Fund, Dr. H. A. Des Vœux, at 14, Buckingham-gate, London, S.W., and should be made payable to the Belgian Doctors' and Pharmacists' Relief Fund, crossed Lloyds Bank, Limited.

THE FOOD-SUPPLY OF THE GERMAN PEOPLE.

(*Concluded from p. 1186.*)

IN the third chapter of their little practical manual Dr. Kuczynski and Dr. Zuntz deal with the measures necessary to regulate the approaching harvest in the light of the experience gained and set out in the previous chapters (THE LANCET, Feb. 26th and June 10th). The authors assume that the prohibition of exportation of foodstuffs and fodder must be more strictly observed than in the first year of war, and that their importation will be encouraged. They go on to consider the minor administrative details necessary to ensure these ends. *Their arguments, as before, are given in their own words.* Where dates are given the year, if unstated, is 1915.

Control of the fresh supplies of rye, wheat, and oats.—By order of the Government the remaining supplies of wheat and rye were taken over from Feb. 1st, and by an order of Feb. 13th the supply of oats was taken over from Feb. 16th. In consideration of the fact that the new harvest year begins with a reduced supply and that the harvest is unlikely to be so copious as in 1914, the taking over of the harvest from the outset is imperative. By so doing more generous rations will be possible—e.g., farmers will be able to give 10·5 kg. of bread corn a head per month to their labourers and servants in place of the 9 kg. of last February, and keepers of horses can be allowed at least 2 kg. a head of oats for their animals in place of the 1·5 kg. of last year. On March 12th, the supplies of barley were taken over. If the rye, wheat, and oats are controlled this measure may not be necessary, but it could be resorted to if the supplies shrank very seriously, especially as the production of barley groats is to be encouraged to meet the shortage in rice and pulse. There is no ground for prohibiting the making of malt coffee, as that beverage contains about 50 per cent. of the nutriment of the barley.

Observation of the prohibition of the use of bread corn as fodder.—By order of the Government of Oct. 28th, 1914, the feeding of animals with rye and wheat capable of being made into bread, and also with flour was forbidden. On Jan. 6th the prohibition was extended to bruised grain, to rye and wheat mixed with other fruits, to any meal that can be used in bread mixed with flour, and to bread—with the exception of spoiled bread and scraps; and finally scraps that could be used as food were also included. It is conceivable that such prohibitions might be dispensed with if the new harvests were taken over by the Government at the outset, but there would still be the danger that those who were allowed supplies for themselves and others dependent on them would during winter make use of bread corn as fodder. The authors therefore recommend that these prohibitions be made to hold good for the coming harvest year.

Restrictions in connexion with the use of oats as fodder.—By an order of Jan. 21st the use of oats for fodder in any form was forbidden except for solipeds. After the oats had been taken over by the Government on Feb. 16th a certain liberty was allowed for the use of oats in feeding calves, lambs, draught and breeding animals. This liberty may be ventured upon for the new harvest year after a certain daily ration has been assured to each soliped, except in the case of oxen used as draught animals.

Maximum prices for rye and wheat.—The maximum prices fixed in October, 1914, for rye and wheat were higher than the average prices of the last 40 years, and the majority of the population would probably wish them to be reduced. It is, however, to be borne in mind that for various reasons the coming harvest is likely to be a moderate one, and therefore a lowering of the maximum prices cannot be recommended. At the same time, the maximum prices should not be raised unless the average yield per hectare should be lower than the average of the last ten years. In any case, a raising of prices should not take place, the authors think, immediately after the harvest, lest such an action should lead to the retarding of threshing and the holding back of cereal supplies.

Fixing of a moderate maximum price for barley and oats.—In Oct., 1914, the maximum price per ton of inland barley whose weight per hectolitre was not more than 68 kg. was lower than that of rye by M. 13 to M. 15 in barley

producing districts, and M. 10 in districts where the barley was used as fodder, the object being to protect the rye stores. The plan of leaving the heavy barley free from price restrictions resulted in the almost total disappearance of light barley from the market and a great rise in price of the other kinds. Whereupon the maximum price of all inland barley was made equal to that of rye (Dec. 19th, 1914). To lighten the burden for retailers the sale of barley up to three tons was not restricted as to price. When the barley was taken over by the Government the maximum price was raised by M.50, and the special price for sale up to three tons was also raised. This was done in order to compensate the barley dealers who could no longer sell small quantities at their own prices, and also to give the farmers whose barley had been taken the opportunity of dealing in other fodder materials of high value.

On Oct. 29th it was officially declared in the *Norddeutsche allgemeine Zeitung* that no maximum price was necessary for oats, as the military authorities had so far been able to supply their needs at suitable prices; but on Nov. 5th, 1914, a maximum price was fixed which was from M. 3 to M. 17 per ton lower than that of rye. On Dec. 19th, 1914, it was announced that these prices did not hold good for sales to retailers or consumers of not more than three tons, but when the supplies were taken over by the Government the maximum for such sales was raised by M.50. For the new supplies the authors agree that it seems desirable, owing to the altered circumstances, for the maximum prices of oats and barley to be at least as low as that of rye.

Retaining of the regulations for grinding corn into bread flour.—According to the regulation of Jan. 5th, rye flour was to contain at least 82 per cent. of the rye, and wheat flour 80 per cent. of the wheat. The district authorities can now allow the wheat and rye to be ground in such a way as to produce 10 per cent. of superfine flour. By an order of April 29th the Government decreed that produce should be allowed to the semolina factories, of which there are about 10 or 15 in Germany, for the manufacture of semolina. The authors recommend that these regulations be adhered to at any rate for the first six months of the new harvest year, in spite of the growing scarcity of bran. After six months or so, if the cereal supplies are ample, the flour may be allowed to contain a lower percentage of the grain, to provide a supply of bran and also the luxury of finer flour.

Simplification of the regulations controlling flour-mixing and bread-making.—According to a measure of Jan. 5th only fine wheat flour might be sold unmixed. Other wheat flour must contain 30 per cent. of rye flour, and this must not be superfine rye flour. Bread might not be baked from unmixed wheat flour, or from unmixed superfine flour of either wheat or rye. Wheat bread must contain 30 per cent. of rye, and may further contain up to 20 per cent. of potato flour. Bread might be made entirely of rye flour if that flour contained at least 93 per cent. of the grain. Otherwise it must be mixed with potato flour, which might itself be mixed with barley, oat, or rice flour, &c. For the new harvest these regulations can be simplified. By the forbidding of baking at night and consequent prevention of a superfluity of white bread, the baking of bread from pure wheat flour has been rendered allowable for the future. The mixing of potato flour with rye flour should be continued, but for the first few months there should be a prohibition on the use of the various forms of dried potatoes, so that the fresh potatoes, which decrease in nutriment by keeping, should be used first. The scanty supplies of rice, maize, pulse, &c., should be kept entirely for household use. In baking bread, superfine flour, either of wheat or rye, should not be used. Rye bread may be made from unmixed rye flour containing at least 93 per cent. of the grain. Finer rye flour must only be used when mixed with mashed or grated potatoes, and the percentage of potato to rye flour must be, weight for weight, at least as 25 is to 75. In making rye bread no wheat flour must be used, and up till March 1st, 1916, no preserved potatoes.

Increasing of the flour-rations of the population entitled to maintenance.—On Feb. 9th the rations allowed for people entitled to maintenance was 225 grammes per head daily, and on March 3rd this was reduced to 200 gm. For the future, even if the harvest should be a very poor one, at least 250 gm. may be allowed per head. In case of a satisfactory harvest it is possible that the accustomed allowance of 340 gm. may be allowed, but the authors emphasize the fact that care is necessary not to increase the rations to such an extent that the people, who have grown accustomed to a careful use of bread, should be encouraged to grow careless. A ration of 250 gm. to 300 gm., according to the yield of the harvest, is to be recommended, and it may be left to individuals how much shall be used as flour and how much baked into bread.

Control of the potato-supply.—To prevent the mistakes of last year in this matter a careful regulation of the potato crops must be made at the outset. In the opinion of the authors it is desirable that large quantities of potatoes should be dried immediately. While their nutritive value is highest—i.e., when they are freshest—it is well to use the overplus freely for fattening pigs. The central authority, however, must without delay make arrangements for buying up all the stores that will be necessary for the population, according to information supplied by the communes, allowing a minimum of 1 pound a head daily. The central authority should further guarantee the necessary potato-supplies to the drying factories, and the latter should be obliged to store their dried potatoes until March 1st, while the former must arrange a loan up to three-quarters of the maximum price which is reckoned from the maximum price of the fresh potatoes and the cost of drying. By a stock-taking before March 1st the central authority will be able to decide what quantities of dried potatoes must be reserved for human consumption, and what can be set aside for fodder.

Maximum price for eating-potatoes.—By an order of Nov. 23rd, 1914, the maximum price of potatoes for cooking was fixed at from M. 50 to M. 61 a ton, according to the kind and the district. On Feb. 15th this was raised by M. 35 a ton to limit their use as fodder and so increase the supply. On April 15th a tax for damage, storage, loss, &c., was allowed when supplies were sold to the Government, communes, &c., which began at M.20 a ton, and increased to M.80 in June. The original maximum prices were fairly low, the later very high, and the indemnification for storage, &c., was much too high. The authors consider that it would be advisable to fix a maximum price after the next harvest in case of copious supplies at not much over that of November, 1914, and in case of a poor crop at about that of February, with an additional payment of storage similar to that of last April, and only moderately rising.

Maximum prices for pigs.—By an order of Feb. 25th a maximum price for pigs of from 60 to 100 kg. was fixed at M. 49 to M. 66 per 50 kg. according to weight in life. In May this price was raised, and since then the price for fattened pigs has risen to over M. 100 per 50 kg. This price corresponds to a price of barley of over M.364 a ton, and of potatoes of over M.93 a ton. As a maximum price for barley (unless the harvest should fail) has been recommended at M.220 to M. 237, and that for potatoes at M.60 to M.70, the maximum price of pigs if adjusted to these prices should be from M 60 to M.65 per 50 kg. From December onwards, to cover a suitable profit for the producers, the maximum price might be fixed at from M.70 to M.75 per 50 kg. This reduction in price must be brought about gradually. If sufficient supplies cannot be bought at these prices for the needs of the people, a power of compulsion must, the authors contend, be made over to the communes, by which power also an immoderate use of foodstuffs as fodder can be avoided.

Wholesale and retail maximum prices.—If the producers are obliged to adhere to the regulation of prices it is only fair that the consumers should also be bound by them. Maximum prices must therefore be fixed for retailers also, and must be reckoned according to the conditions obtaining in any given place.

Prevention of damage caused by wild creatures.—The damage to the harvest caused by rabbits, pigs, roebuck, deer, &c., must be strenuously guarded against. Indemnification for loss does not compensate for the shortened supplies. Hitherto the local authorities have had more interest in the hunting tenants than in the feeding of the population. The landowners must be empowered to kill the game that harm the crops, and if the local authorities refuse to grant this right the authors would advise facilities for a prompt appeal to a higher court.

Foodstuffs to be obtained from trees and forests.—The State forests are already free for the obtaining of fodder and the supporting of pigs, and private forests must also be thrown

open for the gathering of the fruits by women and children, or the feeding of pigs, according to the local conditions. The leaves of trees, hedgerows, &c., in the roads must also be widely used as green fodder and, when dried, as hay, particularly in localities where the hay crop is sparse. The hay should be made at once while the leaves are at their best. It is now the time also to make preparations for obtaining the nutriment from winter sap-wood both in setting up mills and in establishing chemical methods of extracting the nutriment, by boiling and by pressure. Besides the direct use of the prepared sap-wood as fodder there is the conversion of the cellulose into sugar with its accompanying gain in alcohol by methods which have already been discussed. This has the further advantage that the distilleries will use fewer potatoes, and the authors emphasise the advisability of removing as soon as possible the legislative and technical difficulties which lie in the way of the production of alcohol from wood and similar substances.

Compulsory notification of the harvest yield, and of occasional supplies.—Up till the present the harvest yields of single holdings have not been recorded, indeed, reports had merely been made in November of each year of the average yield per hectare in the various fruits. During the first year of the war, however, it became necessary to have more exact information, and by an order of Feb. 1st all who possessed stores in wheat, rye, oats, and flour were obliged to notify to the authorities in whose district the supplies were stored. This compulsory notification must be extended after the next harvest. Immediately after the bringing in of the crops their quantities must be notified, and this must apply to all kinds of fruits. By an order of Feb. 2nd a stocktaking of the stores of the food-stuffs and fodders was to be made every quarter, and the incomplete or false notification of stores was to be severely punished. The intervals allowed for the authorities to collect these numbers should, the authors think, be as short as possible.

The counting of the cattle.—In 1913 and 1914 the live-stock in general were counted on Dec. 1st, 1914, and the pigs on June 2nd. In the first half of 1915 there were two countings of the pigs. These countings were not sufficiently frequent, while the voluntary appointment of a date for counting might easily lead to false results. Owing to the fact that from April 15th the Government has neglected to order a census of the pigs, it is at present unknown how far the numbers have increased since the last census was taken. It is advisable, therefore, that while the war lasts a census of agricultural animals should be taken on August 1st, Dec. 1st, and April 1st; and further, a census of pigs on Oct. 1st, Feb. 1st, and June 1st. The next count should take place at latest on August 1st. These counts can be simple ones, but a further count should be made of milch cows and special counts of pigs of under 8 weeks, one of pigs of from 8 weeks to 6 months, one of pigs from 6 to 12 months, including breeding boars and breeding sows, and one of pigs of one year or more, including both sexes of breeding pigs.

THE SERVICES.

ARMY MEDICAL SERVICE.

Lieutenant-Colonel A. L. A. Webb, C.M.G., to be Deputy Assistant Director-General, vice Lieutenant-Colonel H. P. W. Barrow.

ROYAL ARMY MEDICAL CORPS.

H. G. G. Cook to be temporary Lieutenant-Colonel whilst in charge of the Welsh Hospital, Netley.

Temporary Captain Alic Phillips to be temporary Major.

Temporary Captain R. C. Brown, relinquishes the rank of temporary Major on ceasing to be employed at the Springburn and Woodside Hospital, Glasgow.

Temporary Captain E. Black to be Major.

Temporary Lieutenant T. H. T. Frampton to be temporary Major.

Temporary Lieutenants to be temporary Captains: T. M. M. Horsfall, F. M. Kirwan, J. H. Robertson, L. F. E. Jeffcoat, D. Kelly, H. Webb, R. J. Bruce, W. S. Pickup, K. M. B. Simon, D. A. Hutcheson, H. Bates, F. E. McGee, E. I. P. Pellew, W. H. McKinstrey, W. E. L. Fowler, E. R. Welsh, H. S. Millar, T. L. Kenion, W. M. Thunder, G. R. C. Wilson, B. Beamish, T. MacKinlay, W. H. Hardy, C. C. G. Gibson, N. G. Meade, B. S. Taylor, R. T. Herdman, A. D. Forbes, J. E. M. Wigley, J. Macqueen, H. B. Elton, J. D. Wilkinson, S. Cross, B. Cuppage, A. J. Davoren, H. Blundell, A. Cameron, R. Donald, F. W. Fawssett, A. U. Millar, A. B. McPherson, A. R. Moore, W. Oliver, V. J. Ruttledge, T. Readman, H. D. Smart, H. K. Wallace, J. J. K. Pentony, J. N. Martin, A. Farquhar, G. Habgood, G. H. Thompson, B. M. Hunter, A. H. Thomas, I. H. S. Hawes, W. A. Wheeldon, A. Whitby, G. W. Stanley, T. H. Fowler, A. J. Dempsey, T. Bennett, C. L. Lakin, R. Grant, G. W. B. Waters, J. R. Burn, B. N. Norman, S. H. Booth, J. J. Foley, W. J. Jameson, J. E. Forster, P. L. Watkin-Williams, J. C. Osburne, H. B. Wilson, E. J. Tyrrell, J. D. Benjafield, R. Power, A. E. Henton, W. R. Honeyburne, W. J. G. Henderson, W. Cooper, J. F. West, G. Clarke, J. M. Coates, C. W. Wilson, M. J. Gallagher, S. Batchelor, R. Hamilton, H. W. Binks, G. J. Fraser, H. S. Groves, L. R. Lempriere, R. McLean, G. McNeill, A. Verling, A. S. Wilson, W. F. Rhodes, F. E. Chapman, G. Hamilton, M. Macnicol, P. Templeton, E. R. Lyth, F. M. Harvey, T. B. Evans, F. R. Brown, A. McL. Cato, E. G. Goldie, J. M. D. Mitchell, G. P. Taylor, J. C. Michell, J. Low, E. B. Collings, J. Anderson, E. S. White, T. T. Apsimon, H. G. Davison, J. Clark, T. Kirkwood, A. E. Thompson, A. B. Northcote, H. R. Hurry, F. W. W. Griffin, A. N. Clemenger, D. C. Evans, R. R. Scott, L. W. Shelly, I. Alluan, J. L. Williams, F. E. Reynolds, C. B. Heald, J. Cunningham, L. G. McCune, B. G. Klein, W. T. Buchan, E. Coleman, J. Proctor, D. C. Welsh, W. L. Christie, J. L. Dimond, D. A. Powell, R. H. Drennan, W. A. Easton, H. P. Sheppard, A. Massey, W. R. Meredith, J. Corcoran, F. B. Gurd, P. M. O'Sullivan, L. E. Williams, D. E. S. Wishart, G. Allison, H. C. Martin, T. D. Cumberland, R. C. Coatsworth, M. E. Gorman, T. H. Crews, H. P. Hamilton, F. W. Clement, W. Edmonson, C. Salkeld, A. J. Clayton, J. K. M. Dickie, H. W. Scott-Wilson, L. A. Carr, J. T. Courtice, H. A. Cates, A. E. Lyster, L. E. Ashley-Emile, R. Nunn, N. W. Jenkin, A. J. Lewis, H. J. McCurrich, P. A. Doyle, K. B. J. Vickers, G. B. Crawford, D. Fettes, B. N. Sinclair, J. L. Callaghan, W. H. Brown, A. S. Richmond, D. A. Fletcher, G. M. Shaw, J. V. Williams, H. G. Murray, C. H. MacLean, M. Manson, H. W. Scawin, M. O'Brien, K. Fraser, W. D. Lawrie, W. S. Campbell, N. A. A. Hughes, L. W. Evans, R. N. Porritt, D. W. Torrance, R. I. Douglas, J. B. Scott, C. A. Brisco, F. W. Campbell, P. R. Browning, C. W. Green, W. J. B. Brown, J. F. Ryan, G. B. Burwell, E. F. G. Ward, D. A. Macfarlane, K. E. Millan, J. S. Stewart, N. M. Grace, G. S. Cronk, W. F. Clark, J. H. Box, A. G. Howson, H. L. Jarman, W. J. Symes, M. A. Collins, W. J. Grant, and G. A. Greaves.

To be temporary Captains: B. J. Collingwood, T. L. Wormald, A. W. C. Lindsay, D. Macnish, and H. F. Strickland.

Temporary Honorary Lieutenants to be temporary Honorary Captains while serving with No. 6 British Red Cross (Liverpool Merchants' Mobile) Hospital: H. Browning, H. W. Jones, and F. C. Wilkinson. E. M. Eaton to be temporary Honorary Captain whilst serving with No. 2 British Red Cross Hospital.

Temporary Honorary Lieutenants to be temporary Lieutenants: P. A. Dargan, L. M. Davies, and L. W. Jones.

To be temporary Lieutenants: J. N. Cruikshank, A. Davidson, J. B. Fisher, M. M. Frew, T. R. Fulton, G. Kirkhope, D. Kennedy, W. N. Montgomery, W. C. Gore, R. E. J. St. John Griffin, J. S. Kinross, D. W. Smith, P. G. Russell, E. H. Eastwood, N. B. Capon, C. E. Wise, F. W. Clark, J. Jaffé, J. B. P. McLaren, O. C. M. Davis, J Devine, J. Cross, J. Glaister, Z. A. Green, H. R. Tighe, T. W. Bailey, J. Crean, A. G. L. Smith, J. G. Forbes, R. O. Lee, D. H. A. Galbraith, S. F. Harris, C. R. Reckitt, J. W. Thomas, T. H. Jackson, W. S. King, T. O. Robson, A. E. Burroughs, W. H. T. Jones, J. A. Giles, E. N. Glover, H. J. C. Gibson, J. A. Edmond, E. J. Mannix, E. Lanzon, and R. B. Bryan.

To be temporary Honorary Lieutenants: F. C. Ormerod, A. G. Morris, D. G. C. Tasker, S. Hutchinson, and A. J. Bado.

Temporary Lieutenants relinquishing their commissions:—L. B. Graham, J. J. McConnell, H. H. R. Clarke, T. H. Harker, H. G. G. Jeffreys, S. E. Holder, G. E. Kinnersley, J. MacDonald, J. L. Atkinson, M. J. McCarthy, D. Moodie, J. Rae, M. S. Fraser, D. G. Perry, R. Hamer, W. H. MacKinlay, G. Gardner, R. Spears, T. G. Elsworth, J. P. Kitson, A. S. McNeil, J. Jones, P. K. Muspratt, H. W. Kerfoot, J. A. Evans, R. H. Bonnycastle, G. A. Wyon, J. Coffey, J. T. Dickson, J. M. Taylor, F. Radcliffe, W. Stewart, P. MacDonald, W. J. M. Marcy, R. L. B. Smith, E. V. Frederick, and A. W. G. Murray. R. M. Chance on account of ill-health.

Canadian Army Dental Corps: Captain F. A. Harwood (Canadian Militia) to be temporary Captain.

TERRITORIAL FORCE.

Royal Army Medical Corps.

Welsh Border Mounted Brigade Field Ambulance: Captain F. H. Lacey, from a General Hospital, to be Captain. Lieutenant D. P. H. Gardiner to be temporary Captain.

Home Counties Casualty Clearing Station: Lieutenants to be Captains: T. W. Hancock, W. L. Hibbert, A. G. Williams, and H. R. Parsloe. L. A. Célestin and F. F. T. Hare to be Lieutenants.

East Lancs Field Ambulance: Lieutenant A. W. Berry to be Captain.

London Mounted Brigade Field Ambulance: Lieutenant F. P. Smith to be Captain.

South Eastern Mounted Brigade Field Ambulance: Major F. B. Treves to be temporary Lieutenant-Colonel whilst commanding a Field Ambulance.

London Field Ambulance: Captain (temporary .Major) J. W. Bird to be Major. Major J. W. Bird, D.S.O., to be temporary Lieutenant-Colonel.

Welsh Field Ambulance: Major H. T. Samuel to be temporary Lieutenant-Colonel whilst commanding a Field Ambulance.

Highland Casualty Clearing Station: Captain A. Don to be temporary Major. Captain (temporary Major) J. Innes relinquishes his commission on account of ill-health. A. E. Campbell, late temporary Lieutenant, R.A.M.C., to be Lieutenant.

London Sanitary Company: Lieutenant P. E. Lander to be Captain.

Lowland Casualty Clearing Station: Major J. McKie, from a Field Ambulance, to be Major. Major J. McKie to be Lieutenant-Colonel.

West Riding Casualty Clearing Station: Major L. P. Demetriadi to be temporary Lieutenant-Colonel.

Welsh Casualty Clearing Station: Major A. P. Swanson, from Attached to Units other than Medical Units, to be Major. Major A. P. Swanson to be temporary Lieutenant-Colonel.

London (City of London) Sanitary Company: The undermentioned Lieutenants to be Captains: R. J. S. McDowall, S. A. Mann, and J. P. Elias.

Highland Field Ambulance: J. Anderson to be Lieutenant.

Lowland Field Ambulance: T. M. Metcalfe to be Lieutenant.

Eastern General Hospital: Lieutenant-Colonel J. B. Bradbury resigns his commission.

Southern General Hospital: Major R. Coombe is restored to the establishment.

East Anglian Field Ambulance: Lieutenant W. K. Legassick to be Captain and remain seconded.

Home Counties Field Ambulance: Captain G. Eustace, from Attached to Units other than Medical Units, to be Captain.

North Midland Field Ambulance: Captain F. W. Johnson to be temporary Major.

Northumbrian Field Ambulance: Robert Welch and John Searle Burton to be Lieutenants.

London General Hospital: Lieutenant-Colonel W. Pasteur is seconded for duty at a Military Hospital.

Attached to Units other than Medical Units.—Major R. W. Forrest relinquishes his commission on account of ill-health. Captain E. P. I. Coke relinquishes his commission on account of ill-health. Captain H. G. L. Allford, from a Field Ambulance, to be Captain. Lieutenants J. B. Smith and E. T. Roper to be Captains.

VITAL STATISTICS.

HEALTH OF ENGLISH TOWNS.

IN the 96 English and Welsh towns with populations exceeding 50,000 persons at the last Census, 7975 births and 3998 deaths were registered during the week ended Saturday, June 10th. The annual rate of mortality in these towns, which had declined from 17·0 to 12·5 per 1000 in the six preceding weeks, further fell in the week under notice to 12·0 per 1000 of their aggregate civil population estimated at 17,312,295 persons for the year 1915. During the first ten weeks of the current quarter the mean annual death-rate averaged 14·9, against 14·5 per 1000 in London. Among the several towns the death-rate last week ranged from 5·1 in Enfield, 5·8 in Ilford, 6·1 in Aberdare, 6·3 in Walthamstow, and 6·5 in Wakefield, to 17·6 in Ipswich and in Sunderland, 18·1 in Oxford, 19·1 in Gloucester, 20·3 in Gateshead, and 20·7 in Stockton-on-Tees.

The 3998 deaths from all causes were 165 fewer than the number in the previous week, and included 300 which were referred to the principal epidemic diseases, against 326 and 335 in the two preceding weeks. Of these 300 deaths, 102 resulted from whooping-cough, 70 from measles, 63 from infantile diarrhœal diseases, 52 from diphtheria, 9 from scarlet fever and 4 from enteric fever, but not one from small-pox. The annual death-rate from these diseases was equal to 0·9, against 1·0 per 1000 in each of the two preceding weeks. The deaths attributed to whooping-cough, which had been 128, 131, and 125 in the three preceding weeks, fell to 102, and included 22 in London, 13 in Birmingham, 11 in Manchester, and 4 each in West Ham and Liverpool. The deaths referred to measles, which had been 103, 85, and 104 in the three preceding weeks, fell to 70, of which 24 were recorded in London, 6 each in Birmingham, Manchester, and Sheffield, and 4 each in West Ham, Stoke-on-Trent, and Liverpool. The fatal cases of diarrhœa and enteritis (among infants under 2 years), which had been 62, 53, and 58 in the three preceding weeks, rose to 63; 14 deaths belonged to London, 4 to Leeds, and 3 each to West Bromwich, Birmingham, Manchester, and Sunderland. The deaths attributed to diphtheria, which had steadily declined from 65 to 32 in the eight preceding weeks, rose to 52, and included 11 in London, 5 in Middlesbrough, 4 in Liverpool, and 3 in Carlisle. The deaths referred to scarlet fever, which had been 15, 16, and 8 in the three preceding weeks, numbered 9, of which 2 occurred in London and 2 in Liverpool. The 4 fatal cases of enteric fever were three below the average in the earlier weeks of the quarter, and included 2 deaths in London.

The number of scarlet fever patients under treatment in the Metropolitan Asylums Hospitals and the London Fever Hospital, which had steadily declined from 1778 to 1343 in the nine preceding weeks, further fell to 1313 on Saturday last; 166 new cases were admitted during the week, against 139, 161, and 163 in the three preceding weeks. These hospitals also contained on Saturday last 1274 cases of diphtheria, 211 of whooping-cough, 191 of measles, 37 of enteric fever, and 1 of small-pox. The 968 deaths from all causes in London were 49 in excess of the number in the previous week, and corresponded to an annual death-rate of 11·7 per 1000. The deaths referred to diseases of the respiratory system, which had fallen from 405 to 117 in the 12 preceding weeks, rose to 130 in the week under notice.

Of the 3998 deaths from all causes in the 96 towns, 149 resulted from violence, 329 were the subject of coroners' inquests, and 1210 occurred in public institutions. The causes of 27, or 0·7 per cent., of the total deaths were not certified either by a registered medical practitioner or by a coroner after inquest. All the causes of death were duly certified in Sheffield, Leeds, West Ham, Bradford, Newcastle-on-Tyne, and in 75 other smaller towns. Of the 27 uncertified causes, 6 were registered in Liverpool, 5 in Manchester, and 2 each in Darlington and Gateshead.

HEALTH OF SCOTCH TOWNS.

In the 16 largest Scotch towns with an aggregate population estimated at 2,372,000 persons at the middle of this year, 1120 births and 586 deaths were registered during the week ended Saturday, June 10. The annual rate of mortality in these towns, which had been 15·0, 14·4, and 14·7 per 1000 in the three preceding weeks, fell to 12·9 per 1000 in the week under notice. During the first ten weeks of the current quarter the mean annual death-rate in these towns averaged 16·0, against 14·9 per 1000 in the large English towns. Among the several towns the death-rate last week ranged from 6·1 in Falkirk, 8·9 in Leith and in Kirkcaldy, and 9·8 in Kilmarnock, to 15·6 in Ayr, 16·1 in Motherwell, and 16·2 in Dundee,

The 586 deaths from all causes were 82 less than the number in the previous week, and included 52 which were referred to the principal epidemic diseases, against 66 and 54 in the two preceding weeks. Of these 52 deaths, 13 resulted from measles, 12 from infantile diarrhœal diseases, 10 from scarlet fever, 9 from whooping-cough, 6 from diphtheria, and 2 from enteric fever, but not one from small-pox. The annual death-rate from these diseases was equal to 1·1, against 0·9 per 1000 in the large English towns. The deaths attributed to measles, which had been 25, 34, and 26 in the three preceding weeks, fell to 13, of which 9 were recorded in Glasgow and 2 in Dundee. The deaths of infants (under 2 years) from diarrhœa and enteritis, which had been 4, 10, and 7 in the three preceding weeks, rose to 12, and included 5 in Glasgow, and 2 each in Dundee and Motherwell. The fatal cases of scarlet fever, which had been 4, 3, and 5 in the three preceding weeks, rose to 10, and included 3 each in Edinburgh and Paisley. The deaths attributed to whooping-cough, which had been 17, 9, and 10 in the three preceding weeks, numbered 9, of which 5 occurred in Glasgow and 2 in Motherwell. The 6 deaths referred to diphtheria were equal to the average in the earlier weeks of the quarter, and comprised 3 in Edinburgh, 2 in Glasgow, and 1 in Falkirk. The fatal cases of enteric fever were recorded in Glasgow and Dundee.

The deaths referred to diseases of the respiratory system, which had been 106, 101, and 83 in the three preceding weeks, rose to 92 in the week under notice, but were 34 below the number registered in the corresponding week of last year. The deaths from violence numbered 20, against 18 and 34 in the two preceding weeks.

HEALTH OF IRISH TOWNS.

In the registration area of Dublin 219 births and 139 deaths were registered during the week ended Saturday, June 10th. The deaths corresponded to an annual death-rate of 17·7, against 11·7 in London and 12·9 per 1000 in Glasgow.

Of the 139 deaths of all ages, 22 related to infants under 1 year and 26 to persons aged 65 years and upwards. The

deaths referred to the principal epidemic diseases numbered 7, and comprised 3 from infantile diarrhœa, 2 from measles, and 1 each from scarlet fever and whooping-cough.

The causes of 2 deaths were uncertified, and 5 others were the subject of coroners' inquests, while 54, or 39 per cent., of the total deaths occurred in public institutions.

During the same period 192 births and 126 deaths were registered in the city of Belfast. The deaths were equal to an annual rate of 16·3, against 16·0 per 1000 in the previous week, and included 21 of infants under 1 year and 24 of persons aged 65 years and upwards. The deaths from the principal epidemic diseases numbered 6, and included 3 from measles, and 1 each from scarlet fever, whooping-cough, and infantile diarrhœa. The causes of 3 deaths were uncertified, and 1 other was the subject of a coroner's inquest, while 29 of the total deaths occurred in public institutions.

Obituary.

ELFRED CHALMERS AUSTIN, F.R.C.S. EDIN., M.R.C.S. ENG., L.R.C.P. LOND.,

TEMPORARY HONORARY CAPTAIN, R.A.M.C.

THE death occurred early on the morning of June 5th, at the age of 39 years, of Dr. E. C. Austin, medical superintendent of the Withington Hospitals of the Manchester board of guardians. Just over six weeks ago Dr. Austin contracted pneumonia; a week later both lungs were affected, empyema and finally pneumococcal septicæmia supervening.

A student of St. Mary's Hospital Medical School, London, he qualified in 1899, taking the Edinburgh Fellowship four years later. He first held the post of resident obstetric officer to his own school hospital, and later he was house physician to the Leicester Infirmary and Fever House, and afterwards assistant medical superintendent at the Kensington Union Infirmary. For a time he was in general practice at Barnard Castle, but he gave this up about four years ago, on appointment as medical superintendent of the Hope Hospital under the Salford board of guardians. In March, 1915, on the resignation, through ill-health, of Dr. S. Orchard, since deceased, he was appointed by the Manchester guardians medical superintendent of their Withington hospitals; the guardians a few months since decided to transfer the Withington hospitals for use as a war hospital, and at the time Dr. Austin's illness began he was busily engaged on the consequent reorganisation, having been granted a temporary honorary commission as captain in the R.A.M.C. whilst in charge. He published in THE LANCET in 1904 an "Account of 70 Cases of Lobar Pneumonia, with Analysis of Clinical Features and Post-mortem Changes," and it is a melancholy coincidence that he should himself have fallen a victim to a disease in which he took a keen scientific interest. He was a hospital administrator of great experience, keenly interested in surgery, and himself a good operator.

He leaves a widow and two small daughters to deplore their loss.

PROFESSOR SILVANUS THOMPSON.

THE death of Silvanus Phillips Thompson, professor of physics in the City and Guilds Technical College and Principal of the College at Finsbury, took place suddenly on Monday last. Professor Silvanus Thompson was best known as a singularly clear exponent of electrical science, particularly in regard to its many applications to practical affairs. He was a most convincing demonstrator at the lecture table, and his experiments were invariably brilliantly carried out. He was author of several works on practical electricity, dynamos, arc lamps, telegraphy, telephony, and so forth, while latterly he turned a good deal of his attention to the improvement of modern lighting methods. He was first President of the Illuminating Engineering Society, a position he occupied for five years. The valuable services he rendered to the cause of good lighting are very generally recognised. He was particularly active in helping the development of the system of lighting known as the "eye-rest" system. Many of the beautiful examples of artificial internal illumination in our public buildings, in which the light is directed on the object and not on the eye, are due to Professor Silvanus Thompson's studies on the subject and his powerful advocacy of the method. His researches covered a wide ground, so much so that he was generally regarded to be a good all-round physicist.

Correspondence.

"Audi alteram partem."

THE TREATMENT OF GONORRHŒA: A SUGGESTION.

To the Editor of THE LANCET.

SIR,—The results of ordinary methods of treatment of gonorrhœa of the urethra are not infrequently so unsatisfactory that one is tempted to wonder whether the system of "continuous irrigation" applied so successfully to that malignant affection, gonorrhœal ophthalmia (when coming under notice at an early stage), might not be applied in a modified manner to urethral gonorrhœa. Continuous irrigation on the lines adopted for gonorrhœa of the conjunctiva, though very desirable, would not, I fear, be feasible for the urethra, requiring, as it would, the tying of a catheter into the urethra, elaborate arrangements for conducting the irrigating fluid to and from the urethra, and the confinement of the sufferer strictly to bed so long as irrigation is being carried out. The feasibility of continuous irrigation on these lines has, doubtless, been carefully considered also by others, but regretfully dismissed as impracticable, as by myself.

Continuous irrigation in a modified form.—In its ideal form this form of treatment may be impracticable, as ideals often are, but could we not compromise, attempting a modified form of this method of treatment by the very frequent use of some bland, slightly astringent solution introduced into the urethra by means of a small metal or glass syringe. The treatment should, I consider, be started as early as possible after the disease has been noticed, the irritability of the urethra to be first overcome, if necessary, by the use of a local anodyne and of a morphia suppository, this preliminary treatment to be performed only by the attendant or nursing orderly. The patient should, I think, use the syringe every 15 minutes, injecting sufficient solution each time to gently distend, without using too much force, the penile portion of the urethra.

Removal of toxins.—The constant washing away of toxic material could not fail, one would think, to be beneficial, and might tend, I imagine, to prevent that deep excoriation of the mucous membrane of the urethra, which is presumably associated with a prolonged contact of toxins with the mucous membrane, and which is possibly the precursor of those troublesome strictures so commonly met with in the later stages of severe cases of gonorrhœa. Again, is it not through these deep lesions of the mucous membrane that the bacteria gain access to the blood and to the lymph streams, and if we could, by the constant washing away of toxins, prevent these severe surface lesions, is it not possible that many of the troublesome sequelæ of gonorrhœa might be averted?

Difficulties will be met with even in starting the simple method of treatment now advocated, but it seems to me that it should be possible, with patience, to overcome them. For example, it is certain that the objection will be raised that the patient could not be relied on to carry out the syringing as often as is desirable. Supervision will, of course, be necessary, but if the patient has been sufficiently impressed with the dread possibility of slowly narrowing strictures and of gonorrhœal arthritis and other troublesome sequelæ, and if, on the other hand, he be encouraged to hope that by the diligent use of the syringe he may not merely escape these dangers, but is likely to shorten his stay in bed and detention in hospital, and thus to reduce the sum to be deducted from his pay for hospital stoppages, it will, I think, be found that the patient is willing heartily to coöperate. Time sometimes hangs heavy on the hands of a man kept in bed for what is, in the early stages of the disease, only a local affection. If given something useful to do the time will possibly pass more quickly than if left to himself to brood over his misfortunes. Needless to say, the patient should always be warned as to the danger of conveying infection from the urethra to the eyes, and should be instructed to invariably wash the hands after using the syringe, the latter article always to be placed into antiseptic lotion after use.

Douching by nursing orderlies.—By all means let the occasional irrigation by nursing orderlies using douche cans with

rubber pipes and glass nozzles be continued; this procedure, if not performed with too great a pressure of fluid, cannot fail to do good, and may serve to impress the patients with the necessity for the thorough washing away of the foul material lying in the urethra. When there are many patients to attend to and much ward work to do other than irrigation, it is, in my experience, difficult for the nursing orderlies to perform the irrigation as often as is desirable. Patients therefore should be encouraged to carry on the good work with the syringe in the intervals. The extra expense involved in the purchase of syringes may perhaps be an objection. If, however, the stay of the patient in hospital be shortened as a result of the treatment, as I strongly feel will be the case, the effect will be not a loss but a saving of time and money.

I bring this system forward for consideration in the belief that it cannot do harm and may, if thoroughly carried out, do much good, so answering to the requirements considered, it is said by Hippocrates, the old-time healer, to be essential to a good remedy.—I am, Sir, yours faithfully,

J. W. S. SECCOMBE,
Major, R.A.M.C.

June 10th, 1916.

TESTS FOR DIACETIC ACID AND FOR ACETONE IN THE URINE.

To the Editor of THE LANCET.

SIR,—In his interesting paper on "A Case of Acute Diabetes, with Comments, especially in regard to Acidosis," in THE LANCET of June 3rd, Dr. Walter G. Smith gives as an example of "errors culled from text-books" the statement that certain substances, for instance, salicylic acid, give the same reaction in the urine as diacetic acid gives (with perchloride of iron solution). He adds that the reaction is somewhat similar, but that *no practised eye would confound the colours*. I wish to call attention to the fact that the urine of a patient taking salicylates may be made, by the addition of a solution of perchloride of iron, to give *exactly the same tawny port-wine colour* as that which is often regarded as a sure sign of the presence of diacetic acid in the urine.[1] It depends on the relative quantities of the reagent and of the salicylic contents of the urine, whether the tawny port-wine colour or the more usual bluish-red colour is produced. In another place (p. 1117) Dr. Smith says, "Both creatinin (Weyl) and acetone respond to Legal's test." Surely the great point made by E. Legal (1883), when he used the nitroprusside test for creatinin (Weyl) as a test for acetone in the urine, was to finish up the test by adding acetic acid in order to get rid of the colour, or the confusing portion of the colour, due to the necessary presence in the urine of creatinin.[2]

I am, Sir, yours faithfully,
F. PARKES WEBER.

Harley-street, W., June 13th, 1916.

THE INFLUENCE OF DIET ON THE DEVELOPMENT OF CAMMIDGE'S REACTION IN THE URINE.

To the Editor of THE LANCET.

SIR,—It is gratifying to learn from the annotation appearing in THE LANCET of June 10th under the above heading that, although it is now over 12 years since I first described the so-called pancreatic reaction in the urine, it is still of sufficient interest to merit investigation and comment. I am naturally pleased to see that the recent observations made by Dr. C. J. C. Van Hoogenhuyze and Dr. S. Nagasaki confirm its clinical value, but it would seem from some of the statements made that they are not acquainted with many of the developments which have taken place since my original publication. In order to remove some of the misapprehensions to which your annotation may possibly give rise, I should like to point out (1) that Howard and I proved in 1914[3] that the "pancreatic" reaction is due to the presence in the urine of a dextrin, the formula of which we gave; (2) that the reducing substance split off on hydrolysis with hydrochloric acid is a pentose—viz., xylose—and that the "pancreatic" crystals are consequently a xylosazone; (3) that I described a quantitative method of performing the reaction, giving accurate figures by which one urine may be compared with another, under the name of the "iodine coefficient," in 1913[4]; and (4) that Dr. Chalmers Watson drew attention to the relation of the "pancreatic" reaction to the carbohydrate content of the diet as far back as 1910, I believe, and that this question and the effects of treatment on the amount of dextrin in the urine were fully dealt with by me in a paper I read before the Medical Section of the Seventeenth International Congress held in London three years ago.[5]

A method of carrying out the test by comparing the reducing power of the urine before and after boiling with hydrochloric acid, similar to that employed by Dr. Van Hoogenhuyze and Dr. Nagasaki, was experimented with in my laboratory some four or five years ago but abandoned, chiefly owing to the difficulty then experienced in ascertaining the exact end-point of the reduction, in favour of the more accurate iodine coefficient. The latter is directly dependent upon the amount of dextrin the urine contains, and that alone; whereas the figures obtained by comparing the reducing power of the urine before and after hydrolysis include the glycuronic acid, sugar, &c. If one of the methods of estimating the reduction that gives a sharp end-point is employed and the results are interpreted in a qualitative rather than in a quantitative sense, they can be employed no doubt with advantage for rapid clinical work; but it must be remembered that, like the original "pancreatic" reaction, the findings must be considered in the light of the clinical symptoms and be confirmed, if possible, by analysis of the fæces.

I am, Sir, yours faithfully,
P. J. CAMMIDGE.

Nottingham-place, W., June 12th, 1916.

THE FEES OF LOCUM TENENTS.

To the Editor of THE LANCET.

SIR,—May I through your columns contradict an impression which has unfortunately gained ground that it is almost impossible to get substitutes at reasonable fees. Since the war began many hundreds of vacancies have passed through my hands, and I am glad to say that, thanks to the loyal help of many men retired from practice and others ineligible for the army, the supply has so far been equal to the demand. The fees at present obtaining are £7 7*s.* a week for normal practices, less if hospitality is offered to a wife or others. Somewhat higher fees are paid in manufacturing north country and colliery districts. If principals would refuse to pay excessive fees the few men who are trying to take an unfair advantage of their country's difficulties would soon be brought to reason.—I am, Sir, yours faithfully,

PERCIVAL TURNER.

Adam-street, Adelphi, W.C., June 12th, 1916.

SHORTAGE OF DOCTORS FOR THE ARMY AND NAVY.

To the Editor of THE LANCET.

SIR,—In THE LANCET of Jan. 16th, 1915, I suggested that many of the school examining doctors could be relieved of that work by local practising doctors. The Board of Education is now reporting on this proposal. In THE LANCET of May 20th, 1916, I suggested that in order to relieve panel doctors their work should be carried on by local non-panel doctors. I have referred this proposal to the Insurance Commissioners. I wish further to suggest that the three Local Government Boards of the United Kingdom should relieve their public vaccinators and, if need be, the district medical officers of army age by appointing local (over age) practising doctors to carry out vaccination and district Poor-law treatment.

I am informed that there are some 1000 vaccinators in Scotland, 812 in Ireland, and 3000 in England and Wales. Out of these 4812 vaccinators about half would be of military age. This scheme would exist only for war time. I have heard it suggested that the 37,290 registered midwives in England should vaccinate, thus following the system of a number of European nations, but this proposal need not be entertained.—I am, Sir, yours faithfully,

ROBERT R. RENTOUL.

Liverpool, June 11th, 1916.

[1] In a suspected case of diabetic coma, or of threatening coma, this point may, I think, become one of considerable importance.

[2] See the account of Legal's test given in Maly's Jahresber. d. Thierchemie, 1883, vol. xiii., p. 71. (From Legal's account in Nos. 3 and 4 of the Breslau ärztl. Z-itschr. for the same year.)

[3] Observations on the Composition and Derivatives of Urinary Dextrin, THE LANCET, Sept. 26th, 1914 p. 791.

[4] Glycosuria and Allied Conditions, Edward Arnold, 1913, p. 275; The Iodine Coefficient of the Urine, Seventeenth Internat. Cong. of Med., Medical Section, p. 305.

[5] Ibid.

The War.

THE CASUALTY LIST.

THE following names of medical officers appear among the casualties announced since our last issue :—

Killed.

Captain W. S. Armstrong, R.A.M.C., was a student at St. George's Hospital, London, qualifying in 1903. He had held appointments in Newfoundland, and was for a time assistant medical registrar at St. George's Hospital.

Wounded.

Captain D. A. R. Haddon, R.A.M.C., attached to the Royal Scots (Lothian Regiment).

Lieutenant E. V. Sullivan, R.A.M.C., attached to the Royal Field Artillery.

Captain C. F. White, R.A.M.C., attached to the Royal Engineers.

Missing.

Captain F. S. Park, Canadian Army Medical Corps, attached to the Canadian Mounted Rifles.

Captain W. R. W. Haight, Canadian Army Medical Corps, attached to the Canadian Mounted Rifles.

Officially Reported Killed in Action in the Naval Battle of May 31st and now Officially Reported to have been saved by the Germans.

Surgeon-Probationer D. J. T. Oswald, R.N.V.R.
Surgeon-Probationer A. Joe, R.N.V.R.

DEATHS AMONG THE SONS OF MEDICAL MEN.

The following sons of medical men must be added to our list of those who have fallen during the war :—

Second Lieutenant F. J. Cathcart, Royal Field Artillery, only son of Mr. C. W. Cathcart, F.R.C.S. Edin.

Midshipman M. Austen, R.N., H.M.S. *Queen Mary*, only son of Fleet-Surgeon T. Austen, R.N.

Second Lieutenant R. de W. Harvey, Dorset Regiment, attached to the King's Royal Rifle Corps, only surviving son of Mr. H. Harvey, M.R.C.S., L.R.C.P., of Wyke Regis, Dorset.

OBITUARY OF THE WAR.

ARTHUR W. TANNER, M.D. TOR.,

LIEUTENANT-COLONEL, CANADIAN ARMY MEDICAL CORPS.

WE regret to announce the death of Lieutenant-Colonel A. W. Tanner, commanding the 10th Canadian Field Ambulance, from wounds received on June 3rd. Born at Watford, Ontario, in December, 1875, Dr. Tanner graduated at Toronto University in 1899, and settled in practice at Moosomin, Saskatchewan. There he rapidly made his mark as a general practitioner and most capable surgeon. In 1910 he joined the 16th Canadian Light Horse, allied with the 16th (the Queen's Lancers), and within a month of the beginning of the war he was given his Lieutenancy in this Brigade. From being a combatant officer, he transferred to the Canadian Army Medical Corps, and last year was appointed Assistant Director of Medical Services of the 10th Canadian Military District, which included the Provinces of Manitoba and Saskatchewan. As such he was in medical charge of the Sewell Camp in Manitoba, and later was largely instrumental in bringing together and establishing the 10th Field Ambulance. This unit arrived in England on March 13th of this year, and within a month was at work at the front. Here Colonel Tanner immediately impressed all with whom he came into contact as a most capable officer with administrative abilities of the first order. His death represents a very distinct loss to the Canadian Army Medical Service.

Surgeon-General G. Carleton Jones, D.M.S., Canadian Expeditionary Force, writes: "I have only known Colonel Tanner a short time since he joined the Expeditionary Force in England, but from what I saw of his work both here and in France I was particularly struck with his natural ability for military medical work. I feel his loss very much, as it means that the Service is deprived of a most capable and useful officer."

FRANCIS FREDERICK LOBB, M.R.C.S., L.R.C.P. LOND.,

FLEET-SURGEON, ROYAL NAVY.

Fleet-Surgeon F. F. Lobb, who lost his life on H.M.S. *Queen Mary* in the battle of May 31st, was 42 years of age. He received his medical education at St. Mary's Hospital, qualifying in 1898, after which he held house appointments at his own hospital as well as at the London Fever Hospital and the Female Lock Hospital. Joining the Royal Navy, he was on H.M.S. *Thrush* at the time of the Delagoa Bay blockade, and landed at Mossels and Lambert's Bay, receiving the South African medal. In the Gambia River expedition of 1901 he was on shore for ten days and organised a base hospital. Besides the medals for the services which we have noted, Fleet-Surgeon Lobb received the thanks of the Colonial Office for his report on Pitcairn Island in 1908, and the medical service of the navy has lost in him a valuable officer. Fleet-Surgeon Lobb was unmarried.

GEORGE MOORE JOHNSON, M.A., M.B., B.CH. OXON.,

SURGEON, ROYAL NAVY.

Surgeon G. M. Johnson, who met his death on H.M.S. *Defence* in the naval battle on May 31st, was 37 years of age, and the elder son of Mr. G. W. M. Johnson, of Childs' Bank, and of Mrs. Johnson, of Shortlands, Kent. He was educated at Charterhouse School and Magdalen College, Oxford, proceeding to the London Hospital, from which he took his M.B., B.Ch. in 1908. He then held the posts of house physician and later house surgeon at the Radcliffe Infirmary, Oxford. After gaining some experience in general practice, he went to Trinity, Newfoundland, in January, 1913, and practised there till after the outbreak of war, returning to England in January, 1915. He then held the posts of assistant tuberculosis officer and school medical officer for East Suffolk, till he applied for a post as surgeon in the navy, when he was appointed to H.M.S. *Defence* and served in her till he met his death. One of his colleagues writes of him: "Always fond of sport and good at all games, he was a good shot and a keen and successful fisherman and boatman; indeed, in the course of his professional duties in Newfoundland he often went out in such weather that the fishermen would be anxiously waiting his return. He had a very keen sense of his duty to his medical work, to which he applied abilities considerably above the average. His friends—and they were many—felt certain that he would have done good and distinguished service in his profession. Gifted with a superb body, he had a boundless store of energy and lived his life with a zest and keenness it was a pleasure to watch, but beyond all was his unusual capacity of forming real friendships socially and professionally, and his early death will make him sadly missed by a very wide circle." Surgeon Johnson leaves a widow, to whom we offer our sympathy.

JAMES MACCORMAC CALDWELL JOHNSTON, M.B., CH.B. ST. AND.,

LIEUTENANT, ROYAL ARMY MEDICAL CORPS.

Lieutenant J. M. C. Johnston, whose death in action was reported last week, was 32 years of age, and was the elder son of Dr. Robert Johnston, of Dundee. He received his early education at Dundee High School, where he excelled both in his studies and in the various branches of athletics. His medical training was begun at the University of Edinburgh and completed at the University of St. Andrews (University College, Dundee), where he graduated M.B., Ch.B. in 1913. He then acted as house physician to the Dundee Royal Infirmary and started in private practice in Perth. He was always keen on his professional work, in the performance of which he never spared himself. In the summer of 1915 he obtained a commission in the Royal Army Medical Corps, and left for France at the end of September attached to the 76th Field Ambulance. He met his death by shell-fire on May 27th while in the act of dressing a wounded soldier in the trenches. A medical friend writes of Lieutenant Johnston: "Endowed with good capacity and many high personal qualities, he gave great promise of success in his profession. He was very popular with his brother officers in France, and was held in esteem because he excelled in good work, and was most unremitting in ministering to the wounded under very trying conditions." He possessed, we are also told, in a rare degree the confidence and affection of the men under him.

JOHN SIDES DAVIES MACCORMAC, L.R.C.P. & S. EDIN.,

SURGEON, ROYAL NAVY.

Surgeon J. S. D. MacCormac, who was among the victims of the great naval battle of May 31st, was aged 44, the elder son of Mr. William MacCormac, of Banbridge, co. Down, Ireland, and a descendant of Dr. Henry MacCormac, of Belfast, a pioneer of the open-air treatment of phthisis. Educated at the Belfast Academical Institution, he first studied medicine under his cousin, Dr. William Aylmer Lewis, of Oswestry, later going to Edinburgh, where he qualified in 1894. He then acted for a time as dispensary doctor at Loughbrickland, co. Down. Later he started practice in Leicester, where he remained for some years, afterwards coming to London, where he was appointed an anæsthetist to the Royal Dental Hospital, Leicester-square. He became also a lecturer on ambulance work to the London County Council, as well as an ambulance examiner to the Metropolitan Police. He was an indefatigable worker, devoted much time to research, and was the author of several medical and surgical treatises, including "Prolonged Nitrous Oxide Anæsthesia in Dental Surgery." He also invented and improved a number of medical appliances and surgical instruments.

He had always had a leaning towards military matters, and was at the age of 17 a trooper in the Oswestry Squadron of the Shropshire Yeomanry; founded, and was captain of, the First Banbridge Troop of the Boys' Brigade, and held a commission as lieutenant in the Leicester Volunteers. When war broke out he at once offered his services to the Admiralty, was appointed surgeon to H.M.S. *Statesman* and sent to the Mediterranean, being transferred later to H.M.S. *Black Prince*.

Surgeon MacCormac was, it will be seen, a man of wide and varied interests. He was a member of the Orange Institution in Ireland, a Past-Master in Freemasonry, and a musician of no mean order, playing the harp, piano, guitar, and banjo. On the *Black Prince* for a time he conducted the ship's band. He was a straight rider to hounds, a good shot, and keen trout fisherman. He spoke French and Armenian, and wrote his diary in the latter language, as he said then no one could pry into the secrets of his patients. Those who knew him speak of him as being of a sunny, lovable nature, generous to a fault, and always full of hope, no matter how depressing the conditions. A wide circle of friends in London and elsewhere will regret his death. He leaves a widow, the daughter of the late General Sir Charles MacGregor, Quartermaster-General in India, and a little daughter aged seven.

AUXILIARY R.A.M.C. WIDOWS AND ORPHANS FUND.

To our brief report in last week's number of the meeting held at the Royal Army Medical College on June 1st to consider the desirability of establishing a benevolent fund for the Services auxiliary to the Royal Army Medical Corps, we can now add the text of the two resolutions which were unanimously carried:—

(1) That a fund in connexion with the officers of the auxiliary branches of the Royal Army Medical Corps be formed and that a committee be appointed representative of the three branches to formulate a scheme and to report to a further meeting.

(2) That the aforesaid committee be also requested to consider and report as to the possibility of establishing a General Relief Fund for the rank and file of the same forces.

The following officers were elected to form the provisional committee, with power to add to their number:—Colonel W. Culver James (T.F.), Colonel J. Atkins, C.M.G., Lieutenant-Colonel Sir John Collie, Lieutenant-Colonel H. H. Tooth, C.M.G. (T.F.), Major Ewen Maclean (T.F.), Major G. Newton Pitt (T.F.), Captain R. J. Stirling (S.R.I.), and Lieutenant-Colonel F. W. H. Davie Harris as secretary. The further meeting to consider the draft scheme has been fixed for Monday, June 26th, at 2.45 P.M., in the Royal Army Medical College theatre.

CENTRAL MEDICAL WAR COMMITTEE.

A meeting of the Central Medical War Committee was held on June 14th, when Colonel Blenkinsop, R.A.M.C., and Colonel Thom, R.A.M.C., attended, and a very succinct statement was made both as to the actual and immediate medical needs of the army, and as to the future probable demands for medical officers, in bulk and in weekly detachments, for the different zones of war. It was explained how far the need could be met, now and in the near future, by graduates from the Overseas Dominions, now approaching examinations, and by the acceptance of senior men for medical garrison duty, in addition to the men secured under the Enrolment Scheme of the Central Medical War Committee. It was definitely announced that the War Office had decided to give commissions in the Royal Army Medical Corps to medical men between 45 and 55 willing to take whole-time general service in the United Kingdom. This action on the part of the War Office will be welcomed by a large group of medical men who have hitherto been debarred from offering their services to the country, and who will thus set free medical officers in the Territorial Force who have received the military training necessary for foreign service.

The announcement was made to the Committee that the Central Medical War Committee, the Scottish Medical Service Emergency Committee, and the Reference Committee of the Royal Colleges had been definitely recognised by the Army Council.

The chairman of the Central Medical War Committee, Mr. T. Jenner Verrall, stated that the percentage of enrolled men was steadily becoming a very substantial one, the exact figures not

being given at the time, and the general impression received of a review of the work of the Committee, taken in connexion with Colonel Blenkinsop's categorical figures, was that although the Committee had much difficult work ahead, their task was one which could be accomplished.

Professor Henry Littlejohn placed his resignation in the hands of the Committee in the event of it being desired to add an English member on the Committee in his place, but the Committee felt that, quite apart from Professor Littlejohn's personal and great services to the Committee, it was desirable to have Professor Littlejohn on the Central Medical War Committee as a link between that body and the Scottish Medical Service Emergency Committee, of which body he was also a member. Professor Littlejohn was unanimously desired to withdraw his resignation.

MEDICAL PRACTITIONERS AND THE MILITARY SERVICE ACTS.

THE present position will be made clear to all our readers by the letter from Sir Alfred Keogh, Director-General of the Army Medical Service, which follows, and with which is included a very useful Memorandum on the whole subject from the War Office.

To Members of the Medical Profession.

I am extremely anxious to draw your attention to the particular provisions of the Military Service Acts, and of the Regulations now made thereunder, which concern the medical profession. For this purpose I have thought it may be convenient that a special Memorandum should be prepared on the subject, which should note the main points of practical importance to practitioners and the chief considerations, medical, military, and civil, that have been involved in the problem.

I enclose such a Memorandum with this letter, and I am convinced that it is of the highest importance that every practitioner should familiarise himself at once with the exact position, in regard to himself and to the profession generally, which has been brought about by the new conditions, as therein set out.

I desire to emphasise the fact, which will be clear to you, I think, on reading the terms of the Memorandum, that the scheme must of necessity depend for its successful working upon the support and coöperation of the whole profession. It is, I believe, impossible to exaggerate the importance of this effective coöperation; by this alone will it be possible to justify and maintain the very special arrangements now sanctioned by Parliament for the medical profession in relation to military service.

I need hardly remind my professional brethren that in the present circumstances of the nation the medical profession is under a very great responsibility for the welfare both of H.M. Forces and of the civil population. The profession has now been entrusted, in a very special manner, as is explained in the Memorandum, with the responsibility of working out, in coöperation with the Government, what I may perhaps call the mobilisation of the whole of the medical services of this country for its civil needs, on such lines as shall enable the pressing requirements of the Army to be met with the least possible injury to the civil population. A higher responsibility, a more inspiring opportunity, could hardly be imagined for any profession; and, as a member of the medical profession myself, I make no apology for being proud that this call has come to it.

I should like to state how deeply sensible I am of the spirit in which large numbers of medical men have rendered and are rendering essential service to the nation; and I wish to make it absolutely plain that the purpose of the scheme described in the Memorandum is to assist the profession in this great task which I am assured it is most anxious to fulfil—the task of securing the best possible disposal of the energies of the medical men throughout the country by the utilisation of the skill of each practitioner in the sphere in which he is found to be most needed at a given time.

I am convinced by my close and continuous observation of the problem that it is only by means of such a national organisation of medical services, effected by the profession itself, that the profession can be assured of serving the country with the maximum of efficiency and with the minimum of disturbance and friction in the case of individual practitioners.

Under the scheme shown in the Memorandum—given the keen coöperation of the whole profession—I earnestly hope it will prove possible to meet the urgent and ever-varying needs of the naval and military forces for medical officers, and at the same time to maintain, without risk of a breakdown, those medical services which are indispensable to the general civil population—services that are especially vital in time of war in those industrial areas where medical provision is, even in normal circumstances, no more than adequate for essential requirements. This great task can only be achieved, on the lines shown in the Memorandum, by the strenuous and continued efforts of all the members of the profession in all parts of the country.

There is one further point of very great moment which I must emphasise, and on which I must make a personal appeal to those of my professional brethren whom it directly concerns. While the smooth working of the scheme can, as already shown, only be effected by engaging the patriotic support of every practitioner, I am bound in a very special manner to beg the attention of men between 41 and 45 years of age, to the manner in which they, in particular, have it in their power to mar or to contribute to its success.

To every practitioner between these ages, I would say that, while not liable to the provisions of the Military Service Acts, it is open to him (I hope each one will consider whether it is not indeed incumbent on him) to offer himself, by enrolment, as one who may be selected, if needs be, for professional service with the Forces, at home and abroad. It is estimated, on a careful investigation of available figures, that the full acceptance, by the men of these ages, of this opportunity of rendering service to their country would secure an addition of some 40 per cent. to the number of practitioners now otherwise eligible for selection (if required) for commissions in the Royal Army Medical Corps.

Practitioners between 41 and 45 years of age are, in fact, in a position, by now enrolling, to assist in a peculiarly important degree the achievement of the objects of this scheme for the organisation of the profession, thus enabling the Government both to meet the pressing needs of the Forces at home and abroad, and to ensure the maintenance of an adequate medical service for the civil population.

I desire to commend the whole scheme to your careful consideration.—I am, yours very truly,

ALFRED KEOGH,
Director-General, Army Medical Service.

War Office, Whitehall, S.W., June 7th, 1916.

The National Organisation of the Medical Profession in Relation to the Needs of H.M. Forces and of the Civil Population and to the Military Service Acts.

In virtue of the compulsory provisions of the Military Service Acts, doctors up to the age of 41, whether married or single, are under the same statutory obligation as other citizens to serve in H.M. Forces for the duration of the war. The medical man, however, is in a very special position in the following respects: firstly, he is needed in the Navy and Army to render there the same kind of services that he fulfils in civil life; secondly, arrangements can be made in a large number of cases for carrying on his civil work, when he joins the forces, in a manner that will conserve to him or his family, in addition to his military pay, a substantial proportion of the remuneration he would have received had he remained in civil life; thirdly, this bringing about of an arrangement for carrying on his civil duties is often essential in the interests of the civil population and a necessary element in determining which of the men in a given place can most wisely be selected for the Army Medical Service; but, fourthly, the making of such arrangements must rest of necessity with the members of the medical profession.

For these reasons, two special arrangements have been provided under the Military Service Acts in regard to the medical profession: (i.) A special procedure as to questions of exemption of doctors from ordinary military service; and (ii.) a special procedure for selecting, and at the right time in each case, the particular men who can be spared from their civil work to serve as doctors with H.M. Forces with least injury to the civil population, and for retaining in their civil work those who are most needed there in the public interest.

Since both of these processes can be made properly efficient by means only of a *professional* body having full professional knowledge, Parliament has enacted in Section 7 of the new Military Service Act that the question whether a given doctor is to be taken to serve the Army or is to continue to do his work for the civil population, shall be decided by a Central Professional Committee instead of by the ordinary tribunals.

Now it is clear that before any Central Professional Committee can arrive at a wise decision in any given case, it must be in a position to make an accurate comparison of the situation (in different areas, and as between different doctors) as regards the existing supply of medical attendance, of the various types necessary for the civil population. This is especially important in regard to the poorer areas, where the provision in normal times is often barely sufficient for the minimal needs of the people; whereas in several places there can be found a considerable redundance of medical men, many of whom can quite well be spared before the local supply of doctors would be brought down to the level obtaining in normal areas. (The proportion of doctors to population is known to vary very widely, being as low as 1 to 5000 in some areas, and as high as 1 to 900 in others.) And in order to be able to make the necessary comparisons equitably, it is necessary in the first place that the whole supply of doctors of various types in all parts of the country shall have been carefully surveyed, not only on a basis of detailed local knowledge, but also on a comparative basis, from one central standpoint. It is further important that in the process of comparison and selection there shall be within the field of consideration the largest possible number of doctors, including particularly all those in the areas of redundancy as well as the others; for, though many thus included will be over the age for military-medical service, these can be brought into effective count by their taking practical part in arrangements for carrying on the civil practice of some of the men who can in that event, but not otherwise, be spared for the Royal Army Medical Corps.

This very important task of organised selection requires for its proper performance the existence of organisations for collecting detailed local information in all parts of the country, and of a central body in close connexion therewith, for appraising the information,

when collected, on a sound comparative basis, with a reasonably uniform standard, upon equitable professional principles, from a central standpoint, entirely free from personal bias or local prejudice. It is therefore obviously not a task that could have been undertaken at a moment's notice, nor properly achieved if only entered upon at this advanced period of the war.

There was, however, available to the Government an organisation of the kind required, both local and central, which has for some time past been in effective operation in England and Wales, and a similar one also in Scotland, having been set up by the medical profession itself, in the early months of the war, with the coöperation of the Medical Department of the War Office, for these purposes, long before there was any question of compulsory service.

This national organisation of the medical profession is now in three parts: (*a*) The Central Medical War Committee for England and Wales, a body composed of representative medical men of all types in the profession (*see* list below); (*b*) the Committee of Reference appointed (*see* list below) by the Royal College of Physicians of London and the Royal College of Surgeons of London, and consisting of Fellows of those Colleges, to consider cases of doctors on the staffs of hospitals and medical schools in the metropolis, and such other special cases in England or Wales as may be referred to it; and (*c*) the Scottish Medical Service Emergency Committee for doctors in Scotland, comprising representative men of all types in the profession in Scotland (*see* list below).[1]

The first and third of these bodies have local Professional Committees under them, each serving a particular geographical area, which represent and were appointed by the medical men in that area. This comprehensive and representative professional organisation has already been utilised by the War Office in many ways, and also by the Central Tribunal under the Military Service Act in the decision of particular doctors' cases; but its main function has been the selection from time to time of suitable medical men to be offered commissions in the R.A.M.C., and in particular the establishing and conducting, with the Army Council's approval, of a comprehensive Enrolment Scheme[2] for all qualified medical men up to 45 years of age—this being the limit for general service in the R.A.M.C.

This Enrolment Scheme is an officially approved arrangement whereby any duly qualified medical man under 45 years of age, who is willing, is able to enter his name on the Enrolment Register of these Professional Committees as prepared to accept a commission in the R.A.M.C., if and when offered one, undertaking thereby to accept service accordingly, at whatever time (if any) the Committee, after considering all relevant circumstances, shall consider that it is his turn to be selected by the War Office for that purpose. In recognition of the voluntary character of the service thus offered the Army Council have undertaken that a man thus offering himself should have always at least a month's notice before being taken, that he should not be called on to fulfil his obligation of commissioned service for more than 12 months consecutively, and that he should have a certain stated rate of remuneration during the present war.

Under this scheme a very large number of doctors have enrolled, and the Central Committees have compiled a register from the detailed information collected and sent up by their local Professional Committees, indicating the available men of various types in each area, with useful particulars of various kinds in regard to them.

The Government Departments having official relations with the medical profession, e.g., the Local Government Board, the Insurance Commissioners, and others, have worked in close coöperation with the scheme, and representatives of those Departments and of the War Office attend the meetings of the Committee.

This being the officially recognised organisation for coördinating the voluntary offers of medical service for the Naval and Military Forces, steps were taken by the War Office on the passing of the first Military Service Act, and the consequent introduction of compulsory military service for all unmarried doctors under 41 years of age, to secure that those who had thus volunteered should not be prejudiced thereby, and that the fullest use should be made of the scheme in all its possibilities.

With this object the Army Council arranged and announced publicly, firstly, that no doctor who had signified his willingness to accept a commission in the R.A.M.C. would be taken as an ordinary combatant; and, secondly, that *men who had enrolled* under the national organisation scheme of the profession above described *would not be called up* under the compulsory provisions of the Act, but would be left automatically by the Recruiting Authorities in the reserve until selected for a commission in the Royal Army Medical Corps. This was laid down in Army Council Instruction 485, which has been made widely known through the professional press.

Since that date this enrolment has continued, and the Professional Committees have largely extended the scope of their information; and when the introduction of the second Military Service Bill brought into view the application of compulsion for all medical men (as for other citizens), married as well as single, up to 41, thus vastly increasing the number of doctors that would be liable to compulsory service, it became evident that the Government must make still further use of the Professional Organisation, in order to cope with the task of solving equitably and with due regard to the needs of the civil population the many difficult questions involved in the selection of the doctors to be used for the medical service of the army, and the doctors to be left in civil practice respectively. A clause was accordingly inserted in the Bill, which is now section 7 in the Act as passed, authorising the recognition of Professional Committees in place of the Local and other Tribunals, for deciding the cases of all qualified medical practitioners, married or single, seeking exemption (on other than conscientious grounds) from compulsory service under the Acts.

The requisite Regulations under this section have now been made and issued, and the three Professional Committees named above are the committees to be recognised thereunder. It has thus become a matter of great importance to every medical man to know and to realise thoroughly the present position in respect of the profession, generally and individually, both in relation to the Acts and also to the whole question of obtaining a sufficient supply of medical men for our Naval and Military Forces, with as little injury as possible to the medical needs of the civil population.

It is with a view to facilitating the full comprehension of the various points involved in these questions that the present official Memorandum is issued; and it is hoped that the preceding historical and explanatory paragraphs may help in some measure to elucidate the present position as set out in the paragraphs here following.

The Present Position.

It will be found convenient for these purposes to consider the medical profession for the time being, in three categories: (A) Doctors under 41[3] who enrol; (B) doctors under 41 who do not enrol; and (C) doctors over 41.

A.—*Those under 41 who Enrol.*

(i) As explained earlier in this Memorandum, every doctor under 41, single or married, enrolled or not, is, in the same manner as other citizens, under the compulsory provisions of the new Acts; but, if he is enrolled, he will, by virtue of the arrangements given in Army Council Instruction 485 (above referred to), *not* be called up by the Military Authority; that is to say, the War Office refrains from applying to him its compulsory powers as to combatant service if and so long as he is enrolled and undertakes to serve, and (if required) serves, as a commissioned officer in the R.A.M.C whenever this may be found necessary in his particular case. *It is therefore important that every doctor, under 41, not yet enrolled, should at once enrol himself* by applying to the Central Professional Committee and signing the form which will be sent him immediately on application; this should be addressed, if he is in England or Wales, to the Central Medical War Committee, 429, Strand, W.C., and if he is in Scotland to the Scottish Medical Service Emergency Committee, c/o the Royal College of Physicians, Edinburgh.

To remove certain misconceptions believed to be prevalent, it may be well here to repeat that an *enrolled* doctor does not have to make any application to a Local Tribunal for exemption, for the reason that the summons to compulsory service, against which alone would he have any occasion to appeal to a Local Tribunal, does not reach him. He thus has no concern with any Local Tribunal, nor any Local Tribunal with him. For an enrolled doctor is not (where it is known to the Military Authority that he is enrolled) called up by the Military Authority; and if any enrolled doctor does in fact receive a notice paper from the Military Authority calling him up for service, all he need do is to send at once to that Military Authority a certified copy of the Certificate of Enrolment that he has previously received from the Central Committee in London or in Edinburgh; and the Military Authority will then, in accordance with A.C.I. 485, cancel the notice and the practitioner will remain in reserve unless and until selected for a commission in the R.A.M.C.

(ii) Being thus in the reserve, the doctor will remember that, as explained earlier, the decision as to whether and *when* he is to be selected for a commission in the R.A.M.C. and taken from his civil practice to serve as a doctor with the forces, has been delegated to the Central Professional Committees. Thus, every doctor enrolled under the scheme will remain in the Reserve unless and until he is notified that it is proposed to select him for receiving a commission in the R.A.M.C.

If and when he is thus selected, he will receive a notification of this fact officially from the Central Professional Committee, and on receiving this notification, if he is of opinion that his personal or professional circumstances, or any other considerations, would justify his claiming to be left in his civil practice till a later date, or even throughout the war, he must communicate, in writing, at once to the same Central Committee to that effect, when a form will be sent him on which to send full particulars of his case.

He will then receive from the Central Committee a statement of their procedure for considering his case, and of any further information which they may require from him; and in due course the Committee, after consulting the appropriate local committee,[4] and after hearing the doctor if he so desires, will make a final decision.

In cases where the doctor is on the staff of a hospital or medical school in the London County area, the Central Committee will hand on the doctor's application to the Committee of Reference described earlier in this Memorandum, and that Committee will consider and decide the case on such evidence as they think fit, with the same kind of procedure as above, and will communicate their decision to the Central Committee, who will transmit it to the individual and to the War Office.

If it is decided that the doctor is not then to be taken, or not to be taken till some specified later date, he will be informed accordingly by the Central Committee; and in any event he will be given at least a month's notice of the date of commencing service.

If, on the other hand, he is selected, he will be offered by the War Office, on the date indicated to him by the Central Committee, a commission in the R.A.M.C. which he will accept in accordance with the obligation that he entered into when he enrolled under the scheme. In that event his commissioned service will on that occasion be for a period not longer (unless he is willing) than 12 consecutive months, and the terms and conditions of service will be the same as those hitherto obtaining with R.A.M.C. commissions in the present war. (Information on this can be obtained at any time from the War Office.)

In this connexion a point arises on which it is important that doctors should clearly understand the position under the new Acts. Before these Acts the doctor was able at the end of the period of his commissioned service in the R.A.M.C. to return to civil life with no further obligations. But the Military Service Acts make an important difference; for now, on his return to civil life, compulsion applies to him, and if he does not at once enrol again, so as to obtain the conditional immunity from calling up that is then given him by Army Council Instruction 485, he will necessarily be called up for ordinary service by the military authorities, and will only be able to obtain exemption (if at all) from such service through the procedure described under B. below. He should, therefore,

[1] An analogous committee exists also in Ireland, but the present Memorandum deals only with Great Britain.

[2] In Scotland the term used is registration, but in this Memorandum the one word only is used throughout for convenience.

[3] The age limits in (A), (B), and (C) mean, in the case of a married doctor, that he is under or over 41 on June 24th, 1916, and of a single doctor, that he was under or over 41 on March 2nd, 1916.

[4] The Central Committee will not communicate to the local committee any information as to his personal affairs given them by the doctor which the latter has requested them to treat as confidential.

in order to avoid this, immediately enrol himself again, and thus put himself again, for the time being, outside the compulsory provisions of the Acts and come again into the position of being amongst those from whom the Central Professional Committee can select doctors for commissioned service in the R.A.M.C.; and he will be thus selected if and when the Committee thinks it is his turn to be taken again. How soon the Committee will determine it to be his turn (that is to say, how long the interval will be between the end of his first period and the beginning of his second) will be determined by the appropriate Central Professional Committee, who will take into account all the relevant considerations—e.g., the needs of the Army, the needs of the civil population, the number of doctors available, the number who have served for a period, the number who have not, and so forth. Doubtless, when the Committee is making its selections of doctors month by month for the R.A.M.C., men who have not previously served at all will, wherever on a general view of the circumstances it seems possible, be taken before a doctor who has served a period; and therefore doctors may hope that it will usually be found possible to arrange that the second period of commissioned service need not be directly consecutive on the first period, but that an interval will be possible; it being clear, however, as regards doctors under 41, that, in virtue of the compulsory provisions of the Acts, their statutory liability to military service holds good, as with other citizens, for the whole period of the war.

B.—*Those under 41 who do not Enrol.*

A doctor under 41 who is not enrolled does not have any of the advantages conferred by Army Council Instruction 485 explained above, so that an unmarried doctor (not enrolled) under 41 is liable at any time since March last to be called up by the recruiting officer for ordinary combatant service under the compulsory provisions of the Acts unless excepted by an exemption certificate; and a married doctor (not enrolled) under 41 is similarly liable after June 24th, 1916. If, on being thus called up, he desires exemption from ordinary service he must apply to the local tribunal for it; his claim will (unless it is on the ground of conscientious objection) invariably be sent on by the local tribunal, under Section 7 of the Act, to the Central Professional Committee in London or in Edinburgh, as the case may be. This Committee (or, where he is on the staff of a hospital or medical school in the London County area, the Committee of Reference to whom every such case is referred by the Central Committee) will determine whether it is, or is not, necessary that he should be allowed to remain in his civil practice, the procedure for investigation being on the same lines as above explained in respect of enrolled doctors.

If it is decided that he should so remain, whether for a time or indefinitely, the Committee will recommend exemption for such period and subject to such conditions as they deem suitable, and the local tribunal will give the doctor a certificate of exemption accordingly.

If, on the other hand, it is decided that it is *not* necessary that he should be retained, the Committee will so recommend, and the local tribunal will then, under Section 7 of the Act, refuse him exemption accordingly. The military authority will then call him up for ordinary service under the compulsory powers of the Military Service Acts, and the War Office will then (unless they think him unsuited for the R.A.M.C.) offer him a commission in the R.A.M.C.

Those who, on the Committee's recommendation, obtain temporary exemption will similarly be called up by the military authority at the expiration of the period fixed.

As every doctor coming under this heading B, whether refused exemption or exempted only temporarily, will have been brought in under the compulsory provisions of the Acts, and as (by not enrolling) he has not availed himself of the privileges offered under A.C.I. 485, his term of R.A.M.C. service will be for the whole period of the war, and on the ordinary rates of pay, *without any of the special arrangements as to pay or 12 months periods*, or otherwise, that have been accorded to doctors who *offer* themselves for service in the R.A.M.C. in this war.

C.—*Doctors over 41.*

Doctors are eligible *up to* 45 *years of age* for commissions in the R.A.M.C. for general service. But doctors over 41 are not within the compulsory provisions of the Act[5]; they can only be obtained for the R.A.M.C. by their consent. If they have already enrolled and thus given an undertaking to accept a commission in the R.A.M.C., they have pledged themselves to no more than 12 consecutive months of service; and this will also be the case as regards any doctors outside the limits of compulsion who now or hereafter enrol under the scheme. Many doctors over 41 may, on inquiry, be found willing to undertake an enhanced obligation—i.e., to serve a second period after such interval (if any) as the Central Professional Committee may think applicable in each particular case. But as men over 41 are under no statutory obligation to serve, the War Office has no intention of requiring this enhanced obligation to be undertaken by any of these men who volunteer to accept a commission in the R.A.M.C.; this matter will be left, in their case, wholly to the option of the individual, and the hitherto existing terms and conditions of commissioned service in the R.A.M.C. in this war will continue applicable to all doctors outside the limits of compulsion who offer themselves for these commissions.

The Army Council earnestly hope that all the doctors between 41 and 45 who have not yet enrolled will now enrol, and thus bring themselves into the list of possible candidates for commissions in the R.A.M.C. Doubtless, just as in the case of those under 41, many of them cannot be spared from their civilian medical work, or are so placed financially and otherwise that the Committee would decide that they ought not to be taken at all, or not until very late. Possibly a large proportion of them will not be required. But, on the other hand, the addition, by enrolment, of all the doctors between 41 and 45 to the number of those under 41 remaining available now that so many of the much younger men have already joined the army, would mean an addition of nearly 40 per cent. to the field of selection, and thus obviously tend to diminish very greatly the difficulties arising both for their professional brethren under 41, for the needs of the civil population, and for the requirements of the Naval and Military Forces, in the pressing exigencies of the present war.

War Office, 7th June, 1916.

[5] i.e., single doctors over 41 on March 2nd, and married doctors over 41 on June 24th, 1916.

Central Medical War Committee.

Sir T. Clifford Allbutt, K.C.B., M.D., F.R.S., Regius professor of physic, University of Cambridge.
Sir James Barr, M.D., LL.D., consulting physician, Liverpool Royal Infirmary.
Lieutenant-Colonel R. A. Bolam, M.D., M.R.C.P., honorary physician, Royal Victoria Infirmary, Newcastle-upon-Tyne; professor of medical jurisprudence, University of Durham.
Charles Buttar, M.D., D.P.H., M.R.C.S., L.R.C.P. (chairman of Executive Subcommittee).
Major Russell Coombe, F.R.C.S., consulting surgeon, Devon and Exeter Hospital.
Major J. Galloway, M.D., F.R.C.P., F.R.C.S., senior physician, Charing Cross Hospital.
Sir Rickman Godlee, Bart., K.C.V.O., LL.D., M.B., M.S., F.R.C.S., consulting surgeon and Emeritus professor of surgery, University College Hospital; late President of the Royal College of Surgeons of England.
Major W. J. Greer, F.R.C.S.I., honorary surgeon, Royal Gwent Hospital, Newport, Mon.
N. Bishop Harman, M.B., F.R.C.S., senior ophthalmic surgeon, West London Hospital.
Thomas Hennessy, F.R.C.S.I., secretary of the Irish Joint Medical War Committee.
Professor Harvey Littlejohn, M.B., F.R.C.S., Dean of the Medical Faculty, Edinburgh University
Major Albert Lucas, F.R.C.S., honorary surgeon, General Hospital, Birmingham.
J. A. MacDonald, M.D., LL.D., honorary physician, Taunton and Somerset Hospital, chairman of council, British Medical Association.
Sir Alexander Ogston, K.C.V.O., M.D., LL.D., consulting surgeon, Aberdeen Royal Infirmary; Emeritus Regius professor of surgery, University of Aberdeen; Surgeon in Ordinary to His Majesty the King in Scotland.
Sir William Osler, Bart., M.D., LL.D., F.R.C.P., F.R.S., Regius professor of medicine, University of Oxford.
Edwin Rayner, M.D., F.R.C.S., consulting surgeon, Stockport Infirmary.
B. A. Richmond, M.D., M.R.C.S., L.R.C.P., secretary of the London Panel Committee.
A. E. Shipley, F.R.S., Master of Christ's College, Cambridge.
T. W. Shore, M.D., L.R.C.P., M.R.C.S., Dean of the Medical School of St. Bartholomew's Hospital.
Frederick Taylor, M.D., F.R.C.P., consulting physician, Guy's Hospital; President of the Royal College of Physicians of London.
E. B. Turner, F.R.C.S., London, chairman of Representative Meeting, British Medical Association.
T. Jenner Verrall, LL.D., L.R.C.P., M.R.C.S., Direct Representative on General Medical Council (chairman of the Committee).
N. Bishop Harman, Alfred Cox, M.B. } Secretaries, 429, Strand, W.C.

It is proposed to enlarge the committee by the addition of two members having experience of provincial industrial practice.

Committee of Reference.

Representatives of Royal College of Surgeons, England:—
Surgeon-General Sir Watson Cheyne, Bart., K.C.M.G., C.B., President of the Royal College, for whom when absent Sir Rickman J. Godlee, Bart., K.C.V.O. (ex-President of the Royal College), is deputed to act.
Lieutenant-Colonel William F. Haslam, F.R.C.S.
Lieutenant-Colonel D'Arcy Power, F.R.C.S.
Charles Ryall, F.R.C.S.

Representatives of the Royal College of Physicians, London:—
Frederick Taylor, M.D., F.R.C.P., President of the Royal College (chairman).
Major Sidney Martin, M.D., F.R.C.P.
Lieutenant-Colonel W. Pasteur, M.D., F.R.C.P.
Captain H. G. Turney, M.D., F.R.C.P., F.R.C.S.
Secretary:—F. G. Hallett, Conjoint Board.

Scottish Medical Service Emergency Committee.

The President of the Royal College of Physicians of Edinburgh.
The President of the Royal College of Surgeons of Edinburgh.
The President of the Royal Faculty of Physicians and Surgeons of Glasgow.
The Dean of the Faculty of Medicine, University of St. Andrews.
The Dean of the Faculty of Medicine, University of Glasgow.
The Dean of the Faculty of Medicine, University of Aberdeen.
The Dean of the Faculty of Medicine, Edinburgh University.
Dr. John C. M'Vail, deputy chairman, National Health Insurance Commission (Scotland).
Dr. Robert Muir, professor of pathology, University of Glasgow.
Dr. T. K. Monro, Regius professor of the practice of medicine, University of Glasgow.
Dr. J. R. Hamilton, chairman, Scottish Committee, British Medical Association.
Dr. John Adams, vice-chairman, Scottish Committee, British Medical Association.
Dr. John Playfair, president of the Edinburgh Medical Guild.
Dr. John Gordon, president, Aberdeen Branch, British Medical Association.
Dr. John Stevens, secretary, Edinburgh Branch, British Medical Association.
Dr. J. R. Currie, senior medical officer, National Health Insurance Commission (Scotland).
J. A. Fleming, K.C., vice-dean of the Faculty of Advocates.
Dr. Norman Walker, M.D., F.R.C.P. Edin., convener.
T. H. Graham, secretary, Royal College of Physicians, Edinburgh

SCOTTISH MEDICAL SERVICE EMERGENCY COMMITTEE.

A meeting of the General Committee was held on Saturday, June 10th, in the hall of the Royal College of Physicians of Edinburgh, the following members attending: the President of the Royal College of Physicians, the President of the Royal College of Surgeons, the President of the Royal Faculty of Physicians and Surgeons of Glasgow, the Deans of the Faculties of Medicine of the Universities of St. Andrews, Glasgow, and Aberdeen, Dr. J. C. M'Vail, Professor Robert Muir, Professor T. K. Monro, Dr. John Adams, Dr. G. C. Anderson, Dr. John Gordon, Dr. John Playfair, Dr. John Stevens, Dr. Norman Walker (Convener), Mr. T. H. Graham (secretary); Sir Donald MacAlister, K.C.B., was also present. The Convener, in reviewing the position of medical men of military age under the Military Service Acts, gave an account of the negotiations with the authorities of the War Office resulting in the establishment of Central Professional Committees for Scotland and England respectively to deal with claims by or in respect of medical men for exemption. A statement was submitted showing that out of about 4000 qualified medical practitioners in Scotland 1617 had rendered service in one or other of the forces of the Crown since the outbreak of the war. In addition to this figure 95 applications for commissions had been recently transmitted to the War Office, making a grand total up to date of 1712. Dr. Norman Walker was elected chairman of the Central Professional Committee for Scotland, and it was decided that five should form a quorum. It was remitted to the Executive Committee to appoint or recognise such local Professional Committees as they might think necessary under the regulations. Sheriff James A. Fleming, K.C., Vice-Dean of the Faculty of Advocates, was appointed a member of the General Committee, and has agreed to act as legal assessor. This appointment is of significance and value, for Sheriff Fleming is a highly distinguished lawyer, and the public will feel that actions taken under his legal assessments will be properly inspired with knowledge and justice.

EDUCATIONAL BOOKS FOR BRITISH PRISONERS OF WAR.—Arrangements have been made, with the approval of the Foreign Office, for extending to British prisoners of war interned abroad the benefits of the scheme, which has been in operation for the last year in connexion with Ruhleben, for supplying selected books of an educational character to those of the interned who may be desirous of continuing their studies in any subject. Under this scheme several thousands of carefully selected volumes, mostly standard works, have been supplied to the Ruhleben Camp, which is now provided with excellent libraries (class, reference, and lending). These books, which have been sent out through the agency of officers of the Board of Education, have proved a great boon to the interned, and have enabled sustained educational work of a definite character to be carried on by the camp education department formed among the prisoners. In view of the value of the work the Board of Trade (Marine Department) have decided to take it into account, in connexion with their examinations for the certificates of competency granted by them to officers of the Mercantile Marine and the Fishing Service. Accordingly, arrangements have now been completed for recording the time spent by any prisoner interned at Ruhleben or Groningen in the study of nautical or other subjects. An appeal is therefore now made for a plentiful supply of new or second-hand books of an educational character (light literature and fiction is available from other sources) to meet the needs of the many thousands of British prisoners interned in enemy or neutral countries. It is to be hoped that to this appeal there may be a liberal response. A circular explanatory of the educational book scheme can be obtained by sending a postcard addressed at the Board of Education, Whitehall, S.W., to Mr. A. T. Davies, who is in charge of the arrangements.

THE WAR AND CHILD WELFARE.—Mrs. Leslie Mackenzie delivered a lecture recently in the Royal High School, Edinburgh, on the War and the Child Welfare Movement, in which she said that, as was shown by the infantile death-rate in Scotland, it was very necessary that the care shown to children under one year of age should be extended until they reached school age. From the reports of the school medical inspectors, who annually examined 400,000 Scottish children, it appears that the inspection and treatment of children before going to school are very inadequate. Voluntary institutions and agencies have done a great deal in the matter, but the problem of the pre-school child has far outrun the resources of voluntary effort, and Parliament has conferred on local authorities new powers to deal with the emergency under the Notification of Births Act and the Midwives (Scotland) Act. The new powers covered the whole period from before birth to the school age, said the lecturer, while the Local Government Board was preparing schemes of maternity service and infant welfare, and the grant-in-aid sanctioned by the Treasury amounted to 50 per cent. of approved outlays. It was expected that a fully developed scheme would enable the medical officer of health to provide each child with a certified health schedule for presentation on admission to school.

THE FEDERATED MALAY STATES HOSPITAL.—Thanks to the liberal financial support accorded by all classes of the community in the Federated Malay States, the committee of management of the Military Hospital established by these States at Blackmore End, Kimpton, Herts, has been able to increase the accommodation from 80 to 168 beds. Two new wards, each of 44 beds, have been erected in the grounds of the house kindly lent by the owner, Mrs. Vincent, the wards being similar in type to those of the Canadian Military Hospital at Orpington, Kent. The hospital is being equipped with an X ray installation, the cost of which is being borne by Messrs. Edward Boustead and Co., of Leadenhall-street, E.C., in conjunction with Messrs. Boustead, Hampshire, and Co., of the Federated Malay States. Captain G. D. Freer, R.A.M.C. (T.), formerly Principal Medical Officer, Selangor, is in charge of the hospital.

ERRATUM.—We referred last week to Sir Nestor Tirard as Commandant of the 3rd London General Hospital. Dr. H. E. B. Bruce-Porter is Commandant of the 3rd London General Hospital, whose staff is drawn from the schools of the University College Hospital, Middlesex Hospital, and St. Mary's Hospital, while Sir Nestor Tirard is Commandant of the 4th London General Hospital, the staff of which is drawn from the medical staffs of King's College Hospital, St. George's Hospital, Charing Cross Hospital, and Westminster Hospital.

Medical News.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.—An ordinary meeting of the Council was held on June 8th, Sir William Watson Cheyne, the President, being in the chair. Mr. W. Sampson Handley was introduced, and the President handed to him a cheque for £100, the Walker prize for 1911-1915, together with a document declaratory of the award.—Mr. Robert Lawford Knaggs and Mr. Jonathan Hutchinson were re-elected members of the Court of Examiners.—A report was read from the Board of Examiners in Anatomy and Physiology for the Fellowship stating that at the recent examination 34 candidates were examined, of whom 11 were approved and 23 rejected.—A report was read from the Court of Examiners respecting the recent examination for the Final Fellowship; 14 candidates presented themselves, and of these 4 satisfied the examiners. It was resolved to issue diplomas of Fellowship to these and to one candidate who had passed at a previous examination and had since attained the age of 25 years.—It was resolved to issue diplomas of the Licence in Dental Surgery to 18 successful candidates.—The following examiners in anatomy and physiology for the Fellowship were then elected: Anatomy: W. H. Clayton Greene, R. W. Reid, Gordon Taylor, and W. Wright. Physiology: G. A. Buckmaster, J. Sydney Edkins, J. B. Leathes, and A. Rendle Short.—The following examiners under the Conjoint Examining Board in England were elected: Elementary Biology: G. P. Mudge and W. G. Ridewood. Anatomy: J. E. S. Frazer, A. M. Paterson, and A. Thomson. Physiology: C. M. H. Howell, H. E. Roaf, and G. A. Buckmaster as substitute for H. E. Roaf. Midwifery: H. R. Andrews, J. S. Fairbairn, C. H. Roberts, and G. D. Robinson. Public Health: Part I., J. W. H. Eyre; Part II., Sir Shirley Murphy. Tropical Medicine: J. W. H. Eyre and C. W. Daniels.—A letter was read from Sir Henry Morris reporting the proceedings of the General Medical Council at their

recent session. The best thanks of the Council were given to him for his services as the representative of the College on the General Medical Council.—The President reported that a meeting of the Fellows would be held on July 6th next for the election of four Fellows into the Council.

As the result of the recent Final Fellowship Examination, which was held from May 18th to 24th, diplomas of Fellow were conferred upon the following four successful candidates:—

Alfred Leslie Pearce Gould, Oxford University and University College Hospital; Temporary Surgeon Robert Sharp Lawson, R.N., Edinburgh University and St. Bartholomew's Hospital; Charles William Berry Littlejohn, Melbourne and Oxford Universities and St. Bartholomew's Hospital; and Francis Donaldson Saner, Cambridge University and Guy's Hospital.

The Diploma of Fellow was also conferred upon the following gentleman who had previously passed the requisite examination and has now attained the age of 25 years:—

George Sefton Miller, Guy's Hospital.

Licences to practise dentistry were conferred upon the following candidates:—

Alec Stuart Blacklaws and Cyril Montague Bullpitt, Guy's Hospital; Joseph John Charles Chiappa, Middlesex and National Dental Hospitals; Barrington Eady, Guy's Hospital; Richard John Spaull Ellis, Middlesex and Royal Dental Hospitals; Richard John Gustave Halden, Guy's Hospital; Austin George Hewer, Middlesex and National Dental Hospitals; Pierre Jean Hugo, Charles Henry Kidner, Frank Cecil Lean, and Oswald Octavius Lloyd, Guy's Hospital; Leslie Grantham Lunnon, Middlesex and Royal Dental Hospitals; Harold Pembroke Mabe, Charing Cross and Royal Dental Hospitals; Benjamin Micklethwait, Middlesex and National Dental Hospitals; and Michael Christian Vos Thom, Herbert Victor Vogt, Maurice Harold Wermig, and Samuel Adolf Woolf, Guy's Hospital.

THE King has appointed Mr. John B. Story, M.B., F.R.C.S.I., to be honorary surgeon-oculist to His Majesty in Ireland, in the place of the late Mr. C. E. FitzGerald, M.D.

Her Majesty the Queen has graciously consented to become patroness of the Incorporated Society of Trained Masseuses.

SOCIETY OF TROPICAL MEDICINE AND HYGIENE.—The annual general meeting of this society will be held at 11, Chandos-street, Cavendish-square, London, W., to-day, Friday, June 16th, at 5.30 P.M.

MEDICO-PSYCHOLOGICAL ASSOCIATION OF GREAT BRITAIN AND IRELAND.—The annual meeting will take place on Thursday, July 27th, at 11, Chandos-street, Cavendish-square, London. It will be mainly of a business nature and without the usual social accompaniments.

DONATIONS AND BEQUESTS.—Mr. and Mrs. W. H. Seager, of Cardiff, have given £2500 to the King Edward VII. Hospital, Cardiff, to defray the cost of the new operating theatre in memory of their son, who was killed at Neuve Chapelle.

HENRY SAXON SNELL PRIZE.—At the opening of the Conference on Sanitary Administration under War Conditions at the Royal Sanitary Institute on June 9th the Lord Mayor of London presented the Henry Saxon Snell prize of 50 guineas and the silver medal of the institute to Dr. William Hanna, assistant port medical officer of Liverpool, for an essay on Suggestions for the Improvement in the Sanitary Arrangements and Appliances Suitable on Board Ship. During the course of the proceedings it was announced that a prize of £50 and a silver medal were being offered by the institute for a thesis on Maternity and Child-Welfare Work.

THE ANNUAL ELECTION AT THE ROYAL COLLEGE OF SURGEONS IN IRELAND.—The annual election of the President, Vice-President, and Council of the Royal College of Surgeons in Ireland took place on June 9th. Mr. William Taylor, Vice-President of the College since 1914, was unopposed in his candidature for the Presidency. He has been a Fellow of the College since 1898, and has been a member of the Council for some years. He is surgeon to the Meath Hospital and Co. Dublin Infirmary. There were two candidates for the Vice-Presidency—Mr. John B. Story and Mr. R. Lane Joynt, of whom the former was elected. Mr. Story is a Fellow since 1880, and has been a member of Council for many years. He was previously a candidate for the Vice-Presidency in 1912. He is surgeon to the Royal Victoria Eye and Ear Hospital. Sir Charles A. Cameron was again elected honorary secretary to the College. The following were elected members of Council:—Mr. William Stoker, Sir Charles A. Cameron, Sir Lambert H. Ormsby, Mr. Richard D. Purefoy, Mr. Henry G. Sherlock, Sir Thomas Myles, Colonel D. Edgar Flinn, Sir Arthur Chance, Mr. Shepherd McC. Boyd, Sir Robert H. Woods, Mr. R. Bolton McCausland, Mr. Thomas E. Gordon, Mr. Edward H. Taylor, Mr. F. Conway Dwyer, Mr. Alexander J. McA. Blayney, Mr. R. Charles B. Maunsell, Mr. Trevor N. Smith, Mr. W. Ireland Wheeler, and Sir C. Arthur Ball. The only changes in the Council are that the places rendered vacant by the death of Sir Charles Ball and by the candidature of Mr. Lane Joynt for the vice-presidency are filled by the election of Colonel Flinn and Sir Arthur Ball. Mr. Edward H. Taylor, Regius professor of surgery in Dublin University, has announced his intention of being a candidate for the vice-presidency of the College in 1918.

THE death is announced from Swaziland of Surgeon-Major R. Clarke Perkins, D.S.O., who died on May 7th, of sudden heart failure. He gained his decoration for attending the wounded under fire during the siege of Wepener in the Boer War.

ROYAL MEDICAL BENEVOLENT FUND OF IRELAND.—The annual meeting of the Royal Medical Benevolent Fund Society of Ireland was held in the Royal College of Surgeons, Dublin, on June 7th, Mr. William Taylor, Vice-President of the College, presiding. The report stated that the total number of applications considered during the year was 93. Of these, 84 were from the widows of medical men, 3 from or on behalf of their orphans, and 6 from medical men themselves. The total sums disbursed in grants during the year amounted to £1232 13*s.* 6*d.* The subscriptions showed a decrease of a little over £200.—At the annual meeting of the Belfast and Co. Antrim branch held on May 30th in the Medical Institute, Belfast, £134 7*s.* 2*d.* was handed to the central treasurer in Dublin. This sum is a slight decrease as compared with the previous year, and lays stress on the fact that a large percentage of medical practitioners in Belfast and Co. Antrim do not support the society.

Surgeon-General John O'Nial, C.B., entered upon his ninetieth year on Wednesday, having been born on June 14th, 1827. He became a Licentiate of the Royal College of Surgeons, Ireland, in 1847, and joined the Army Medical Department as assistant surgeon in April, 1852, attaining the rank of surgeon in 1859, surgeon-major in 1872, and surgeon-general in 1885. He took part in the Kaffir War (1852) and the Umbeyla Expedition (1863), and was principal medical officer of the 1st Division Kandahar Field Force during the Afghan War in 1880 and of the Nile Expeditionary Force in 1884–85. His retirement took place in 1887.

Appointments.

Successful applicants for vacancies, Secretaries of Public Institutions, and others possessing information suitable for this column, are invited to forward to THE LANCET *Office, directed to the Sub-Editor, not later than 9 o'clock on the Thursday morning of each week, such information for gratuitous publication.*

PATON, Major E. L., R.A.M.C., has been appointed by the Scottish Command Senior Medical Officer at Scone.

ROBERTSON, ROBERT, M.B., C.M. Edin., a Vice-President of the Royal National Hospital for Consumption, Ventnor.

WATT, A. BROWN, M.B., Ch.B. Glasg., House Surgeon at Perth V.A.D. Hospital.

Vacancies.

For further information regarding each vacancy reference should be made to the advertisement (see Index).

When the application of a Belgian medical man would be considered the advertisers are requested to communicate with the Editor.

BRADFORD, CITY OF.—Two Temporary Female Medical Officers. Salary 8 guineas per week.

BURY INFIRMARY.—Junior House Surgeon. Salary £150 per annum, with board, &c.

COUNTY OF LONDON.—Assistant Organisers of Children's Care Work under the London County Council. Salary £100 per annum.

DERBY, DERBYSHIRE ROYAL INFIRMARY.—House Surgeon. Salary £200 per annum, with board, &c.

DUBLIN UNIVERSITY, TRINITY COLLEGE SCHOOL OF PHYSIC.—Chair of Surgery.

DUDLEY, GUEST HOSPITAL.—Senior Resident Medical Officer. Salary £150 per annum, with board, &c.

GREAT YARMOUTH HOSPITAL.—House Surgeon, unmarried. Salary £200 per annum, with board, &c.

HORNSEY BOROUGH.—Assistant Medical Officer of Health for Maternity and Child Welfare Work. Salary £105 per annum.

HUDDERSFIELD ROYAL INFIRMARY.—Senior House Surgeon. Salary £150 per annum, with board, &c.

LEEDS CITY HOSPITALS FOR INFECTIOUS DISEASES AND TUBERCULOSIS.—Two Certified Assistant Medical Officers. Salary at rate of £250 per annum each, with board, &c.

LONDON TEMPERANCE HOSPITAL, Hampstead-road, N.W.—Assistant Resident Medical Officer for six months. Salary at rate of £120 per annum, with board, &c.

MANCHESTER BABIES HOSPITAL, Slade-lane, Levenshulme.—Superintendent.

MANCHESTER CHILDREN'S HOSPITAL, Pendlebury.—Locum Tenens Female Resident Medical Officer.

MANCHESTER NORTHERN HOSPITAL FOR WOMEN AND CHILDREN, Parkplace, Cheetham Hill-road.—Female House Surgeon. Salary £120 per annum, with board, &c.
NEW HOSPITAL FOR WOMEN, Euston-road, N.W.—Two Female House Surgeons and One Female House Physician for six months. Salaries £50 per annum, with board, &c.
PLYMOUTH, SOUTH DEVON AND EAST CORNWALL HOSPITAL.—House Physician. Salary £150 per annum, with board, &c.
QUEEN'S HOSPITAL FOR CHILDREN, Hackney-road, Bethnal Green, E.—House Surgeon and House Physician for six months. Salary £100 per annum each, with board, &c.
SHEFFIELD ROYAL INFIRMARY.—House Physician. Salary £120 per annum, with board, &c.
SOUTH LONDON HOSPITAL FOR WOMEN.—Female Pathologist. Salary at rate of £250 per annum.
SUNDERLAND ROYAL INFIRMARY.—Female House Surgeon. Salary £150 per annum, with board, &c.
WEST RIDING OF YORKSHIRE, MIDDLETON-IN-WHARFEDALE SANATORIUM, near Ilkley.—Female Assistant Medical Officer. Salary £300 per annum.
WIGAN, ROYAL ALBERT EDWARD INFIRMARY AND DISPENSARY.—Senior House Surgeon. Salary £250 per annum, with board, &c.

Births, Marriages, and Deaths.

BIRTHS.

ALLAN.—On June 8th, at 119, Radford-road, Leamington Spa, the wife of John Allan, M.D. Edin., D.P.H., of a daughter.
BRADLEY.—On June 11th, at Halstead, Essex, the wife of G. F. Bradley, M.B., B.S. Lond., M.R.C.S., L.R.C.P., of a daughter.
DICK.—On June 11th, at Tatworth, Surrey, the wife of F. A. Dick, M.B., Lieutenant, R.A.M.C. (T.), of a daughter.
HEDDY.—On June 8th, at St. Margaret's Pyrford, Surrey, the wife of Captain W. R. H. Heddy, R.A.M.C. (T.), of a son.
HIGHET.—On June 8th, at Glasnevin, Barnes' Close, Winchester, the wife of Temporary Captain H. C. Highet, R.A.M.C., of a daughter.
POWELL.—On June 12th, at Harrogate, the wife of Major Jack Powell, R.A.M.C., Cairo, of a son.
WRAITH.—On June 11th, at Gwynant, Hampton Park, Hereford, the wife of Oswald S. Wraith, M.D., F.R.C.S.E. (late temporary Lieutenant, R.A.M.C.), of a son.

MARRIAGES.

CAMPBELL—WILLIAMS.—On June 7th, at Caerleon, Monmouthshire, Major Hamilton Campbell, R.A.M.C., D.S.O., to Mary, eldest daughter of Alfred Williams and Mrs. Alfred Williams, of The Mount, Caerleon, Monmouthshire.
CORKE—PETERS.—On June 8th, at Dibden Parish Church, Henry Charles Corke, L.D.S. Eng., to Sophia Augusta, only child of Mr. C. J. Peters, late of the Indian Public Works Department, of Chilgrove, Hythe.
HUXTABLE—HARE.—On June 7th, at the Parish Church, Heathfield, Sussex, Arthur Edward Huxtable, M.R.C.S., L.R.C.P., Captain, R.A.M.C., to Vera Kathleen, only daughter of Mr. and Mrs. Harcourt Hare, of Heathfield, Sussex.
KILNER—SIMPSON.—On June 10th, at St. Leonard's Church, Horringer, Lieutenant Henry Goff Kilner, R.A.M.C., to Mabel Olive, only daughter of Mr. and Mrs. R. T. Simpson, of Horsecroft, Bury St. Edmunds.

DEATHS.

ARMSTRONG.—On May 31st, killed in action, Walter Seymour Armstrong, Captain, R.A.M.C.
CAPPS.—On May 31st, Frederick Albert Capps, D.P.H., Fleet-Surgeon, R.N., son of the late Fleet-Engineer W. F. Capps, R.N., and beloved husband of Helena Capps.
PALMER.—On June 4th, suddenly, at Mundesley-on-Sea, Arthur E. Palmer, M.R.C.S., L.R.C.P., of Loughborough, Leicestershire.
WADD.—On June 12th, at "Burvale," Richmond, Surrey, Frederick John Wadd, M.B., M.R.C.S., aged 71 years.

N.B.—A fee of 5s. is charged for the insertion of Notices of Births, Marriages, and Deaths.

BOOKS, ETC., RECEIVED.

ALLEN, GEORGE, AND UNWIN, London.
Newsholme's School Hygiene. The Laws of Health in Relation to School Life. By James Kerr, M.A., M.D. Fourteenth edition, revised and re-written. Price 4s. 6d. net.

BELL, G., AND SONS, London.
Downward Paths: An Inquiry into the Causes which Contribute to the Making of the Prostitute. With a Foreword by A. Maude Royden. Price 2s. 6d. net.

HEFFER AND SONS, Cambridge.
Tuberculosis and the Working Man. An Appeal to Friendly Societies. By P. C. Varrier-Jones, M.A. Cantab., M.R.C.S., L.R.C.P. Lond. With a preface by G. Sims Woodhead, M.A., M.D., LL.D. Price 6d. net.

ST. CATHERINE PRESS, Stamford-street, S.E.
Campaign for Clean Milk. A series of articles reprinted from the *Observer*. Price 1s. net.

SHAW AND SONS, London.
Clinical Disorders of the Heart Beat. By Thomas Lewis, M.D., D.Sc., F.R.C.P.

SNOW AND FARNHAM COMPANY, Rhode Island.
The Intestinal Putrefaction. By Charles Fenner Peckham, M.D.

Notes, Short Comments, and Answers to Correspondents.

GILBERT AND ELLICE ISLANDS: UNSATISFACTORY HEALTH REPORT.

THE report on the affairs of the Gilbert and Ellice groups of Islands (Western Pacific) for 1914–15 indicates an unfortunate retrogression in matters of health as a result, in part at all events, of the war. The statistics of births and deaths compare unfavourably with those of 1913–14 and Mr. E. C. Eliot, the Resident Commissioner, observes: "With the outbreak of war and the instant disruption of the shipping service, communication between the islands, never good, became almost a thing of the past. At the same time, the extraordinary expansion of the Central Hospital at Tarawa, with its immediate calls on the time of the single European doctor in the Gilbert Group and of the native medical practitioner assisting him, rendered it impossible to take advantage even of the exiguous remaining opportunities of visiting outlying islands, for chances of return were problematical. Shortness of staff under war conditions may be said to have converted into a very hindrance, therefore, the achievement of that centralisation which, at the cost of so much labour, had begun to assume shape as the nucleus of an efficient system. Densely populated islands were isolated. The natives forgot, and the local 'dressers' were unable to enforce, the simple rules of hygiene and common-sense which only the moral spur of a white medical officer's presence can keep before them. The Gilbert islander, so trustworthy in matters of government, has elementary notions about the care of his person. Without the possibility of effective supervision, the natives reverted into the most vicious habit of primitive races—that of concealing sickness. Tuberculosis, which runs so speedy a course in the system of such peoples, has done its work. Syphilis—spelling sterility, miscarriage, stillbirth, and a high infantile mortality—is ever active, while the utter unenlightenment of the natives in matters of health is a constant sap at all efforts to aid them. Without the means of communication between islands the work of the medical officer is at every turn frustrated. It is at such times that the need of a Government vessel is felt." It is added that there is no malaria, but that the stegomyia mosquito abounds in the two groups. Dengue fever sometimes follows the visits of ships. Dysentery is endemic, but of comparatively rare occurrence among European residents. During the year there was an outbreak of typhoid fever on Ocean Island, resulting in the deaths of several Japanese and two Europeans. Immediate measures were taken to ensure the safety of the water-supply, with good effect. The climate is remarkably equable, being tempered by the vast waters in which the islands lie, and by the continuous westerly breezes which prevail. The temperature is subject to but few variations, ranging between 78° and 80° F. as a general rule, and on rare occasions falling as low as 68° or rising as high as 95°. Sunstroke is unknown. On Ocean Island Europeans may be seen working or playing bareheaded in the hottest part of the day. The climate is said to be beneficial to Europeans suffering from asthma or pulmonary trouble. The rainfall for the year ranged, according to islands, from 120 to 140 inches. There are 26 Island Hospitals under the charge of native "dressers" who have gained their experience in the Central Hospital and Medical Training School at Tarawa. All cases of a grave nature are sent to that hospital, whilst cases capable of easy treatment are admitted into the island hospitals. The construction of a leper asylum upon an isolated islet has been decided upon.

HÆMOPHILIACS AND MILITARY SERVICE.

To the Editor of THE LANCET.

SIR,—Are hæmophiliacs fit for army service? A very pronounced case known to me has just been passed. Common-sense seems to indicate that where a medical certificate mentioning a serious disease is handed in further investigation should be made. This was not done in three other cases, and they have all been discharged from the army since.

I am, Sir, yours faithfully,

Liverpool, June 12th, 1916. ROBT. TURNER, M.D. Aberd.

*** Hæmophiliacs are not proper material for soldiers.—ED. L.

D.P.H.—The age has not been considered prohibitive for special appointments, but no ordinary commissions are given to such senior applicants.

COMMUNICATIONS not noticed in our present issue will receive attention in our next.

Medical Diary for the ensuing Week.

SOCIETIES.

ROYAL SOCIETY, Burlington House, London, W.

THURSDAY.—4.30 P.M., Croonian Lecture: Prof. S. J. Hicksyn: Evolution and Symmetry in the Order of the Sea-pens.

LONDON DERMATOLOGICAL SOCIETY, St. John's Hospital, 49, Leicester-square, W.C.

TUESDAY.—4.30 P.M., Annual Meeting. Election of Officers. 5 P.M., Cases sent for Consultation. Demonstration of Pathological Specimens. Exhibition of Clinical Cases by Dr. J. L. Bunch, Dr. M. Dockrell, Captain W. Griffith, Dr. W. K. Sibley, Captain C. H. Mills, and Dr. E. G. Reeve.

ROYAL METEOROLOGICAL SOCIETY, 70, Victoria-street, Westminster, S.W.

WEDNESDAY.—4.30 P.M., Paper:—Lieutenant E. H. Chapman, R.E.: The Relation between Atmospheric Pressure and Rainfall at a Single Station.

WEST LONDON MEDICO-CHIRURGICAL SOCIETY, West London Hospital, Hammersmith-road, W.

FRIDAY.—8.15 P.M., Cavendish Lecture:—Sir John Bland-Sutton: The Fate of Patients who have had Stones Removed from the Kidney.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

POST-GRADUATE COLLEGE, West London Hospital, Hammersmith, road, W.

MONDAY.—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Gray: Operations. Mr. B. Harman: Diseases of the Eye. Dr. Simson: Diseases of Women.
TUESDAY.—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Baldwin: Operations. Dr. Banks Davis: Diseases of the Throat, Nose, and Ear. Dr. Pernet: Diseases of the Skin.
WEDNESDAY.—10 A.M., Dr. Saunders: Diseases of Children. Dr. Banks Davis: Operations of the Throat, Nose, and Ear. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Pardoe: Operations. Dr. Simson: Diseases of Women.
THURSDAY.—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Gray: Operations. Mr. B. Harman: Diseases of the Eye.
FRIDAY.—10 A.M., Dr. Simson: Gynæcological Operations. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Baldwin: Operations. Dr. Banks Davis: Diseases of the Throat, Nose, and Ear. Dr. Pernet: Diseases of the Skin.
SATURDAY.—10 A.M., Dr. Saunders: Diseases of Children. Dr. Banks Davis: Operations of the Throat, Nose, and Ear. Mr. B. Harman: Eye Operations. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Pardoe: Operations.

NORTH-EAST LONDON POST-GRADUATE COLLEGE, Prince of Wales's General Hospital, Tottenham, N.

MONDAY.—Clinics:—10.30 A.M., Surgical Out-patients (Mr. E. Gillespie). 2.30 P.M., Medical Out-patients (Dr. T. R. Whipham): Gynæcological Out-patients (Dr. Banister). 3 P.M., Medical In-patients (Dr. R. M. Leslie).
TUESDAY.—2.30 P.M., Surgical Operations (Mr. Carson). Clinics:—Medical Out-patients (Dr. A. G. Auld); Surgical Out-patients (Mr. Howell Evans); Nose, Throat, and Ear Out-patients (Mr. C. H. Hayton). Radiography (Dr. Metcalfe). 3.30 P.M., Medical In-patients (Dr. A. J. Whiting). 4.30 P.M., Special Demonstration: Mr. C. H. Hayton; Selected Throat Cases.
WEDNESDAY.—Clinics:—2.30 P.M., Throat Operations (Mr. C. H. Hayton). Children Out-patients (Dr. T. R. Whipham); Eye Out-patients (Mr. R. P. Brooks); Skin Out-patients (Dr. H. W. Barber). 5.30 P.M., Eye Operations (Mr. R. P. Brooks).
THURSDAY.—2.30 P.M., Gynæcological Operations (Dr. A. E. Giles). Clinics:—Medical Out-patients (Dr. A. J. Whiting); Surgical Out-patients (Mr. Carson); Radiography (Dr. Metcalfe). 3 P.M., Medical In-patients (Dr. R. M. Leslie).
FRIDAY.—2.30 P.M., Surgical Operations (Mr. Howell Evans). Clinics:—Medical Out-patients (Dr. A. G. Auld); Surgical Out-patients (Mr. E. Gillespie); Eye Out-patients (Mr. R. P. Brooks).

THE THROAT HOSPITAL, Golden-square, W.

MONDAY.—5.15 P.M., Special Demonstration of Selected Cases.
THURSDAY.—5.15 P.M., Clinical Lecture.

ROBERT BARNES HALL, 1, Wimpole-street, W. (by permission of the Royal Society of Medicine).

WEDNESDAY.—8 P.M., Mrs. Mary Scharlieb, M.D.: Inherited Disease in Children (illustrated by the epidiascope). (Lecture I.)

CHADWICK PUBLIC LECTURES, Town Hall, Ilford, E.

Course of Three Lectures on the Prevention of Disease and Frostbite in the Army.

FRIDAY.—8 P.M., Lecture III.:—Professor S. Delépine: The Place of the Laboratory in the Prevention of Disease (illustrated by diagrams and lantern slides).

The following magazines, journals, &c., have been received:—Archives of Radiology and Electrotherapy, Medical Review, Annales de l'Institut Pasteur, Edinburgh Medical Journal, Journal of Laryngology, Rhinology and Otology, Dublin Journal of Medical Science, Surgery, Gynecology, and Obstetrics, Public Health, La Clinique Ophtalmologique, Annali d'Igiene, Indian Medical Gazette, American Journal of Roentgenology, Military Surgeon, Journal of the Royal Army Medical Corps, Maryland Medical Journal, American Journal of Medical Sciences, Medical Review of Reviews.

EDITORIAL NOTICES.

IT is most important that communications relating to the Editorial business of THE LANCET should be addressed *exclusively* "TO THE EDITOR," and not in any case to any gentleman who may be supposed to be connected with the Editorial staff. It is urgently necessary that attention should be given to this notice.

It is especially requested that early intelligence of local events having a medical interest, or which it is desirable to bring under the notice of the profession, may be sent direct to this office.

Lectures, original articles, and reports should be written on one side of the paper only, *and when accompanied by blocks it is requested that the name of the author, and if possible of the article, should be written on the blocks to facilitate identification.*

Letters, whether intended for insertion or for private information, must be authenticated by the names and addresses of their writers—not necessarily for publication.

We cannot prescribe or recommend practitioners.

Local papers containing reports or news paragraphs should be marked and addressed "To the Sub-Editor."

Letters relating to the publication, sale, and advertising departments of THE LANCET should be addressed "To the Manager."

We cannot undertake to return MSS. not used.

MANAGER'S NOTICES.

THE INDEX AND TITLE-PAGE TO THE LANCET.
January to June, 1916.

IN view of the Government restrictions upon the supply of paper, and the shortage of paper quite apart from these restrictions, we cannot include, as usual, in all the copies of THE LANCET the Index and the Title-page which are due at the end of this month. The Index and Title-page will, of course, be prepared, and copies will be supplied gratis to subscribers who intimate their wish to receive them to the Manager, THE LANCET Office, 423, Strand, London, W.C. Such application should please be sent in at once.

TO SUBSCRIBERS.

WILL Subscribers please note that only those subscriptions which are sent direct to the Proprietors of THE LANCET at their Offices, 423, Strand, London, W.C., are dealt with by them? Subscriptions paid to London or to local newsagents (with none of whom have the Proprietors any connexion whatever) do not reach THE LANCET Offices, and consequently inquiries concerning missing copies, &c., should be sent to the Agent to whom the subscription is paid, and *not* to THE LANCET Offices.

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Advertisements (to ensure insertion the same week) should be delivered at the Office not later than Wednesday, accompanied by a remittance.

METEOROLOGICAL READINGS.

(Taken daily at 8.30 a.m. by Steward's Instruments.)

THE LANCET Office, June 14th, 1916.

Date.	Barometer reduced to Sea Level and 32° F.	Direction of Wind.	Rainfall.	Solar Radio in Vacuo.	Maximum Temp. Shade.	Min. Temp.	Wet Bulb.	Dry Bulb.	Remarks.
June 8	29·726	W.	...	119	63	44	48	52	Cloudy
,, 9	29·780	W.	0·03	120	65	49	49	52	Cloudy
,, 10	30·060	N.W.	0·20	118	61	50	51	54	Cloudy
,, 11	30·130	W.	0·21	107	62	46	44	47	Cloudy
,, 12	30·000	N.	0·13	84	50	46	46	47	Raining
,, 13	29·770	N.	0·10	97	56	47	49	50	Cloudy
,, 14	30·020	N.E.	...	69	53	47	48	49	Cloudy

Communications, Letters, &c., have been received from—

A.—Messrs. Adlard and Son and West and Newman, Lond.; Anglo-Russian Hospital, Lond., Secretary of; L'Argus de la Presse, Paris; Lieutenant-Colonel Adami; Messrs. Arnold and Sons, Lond.; Messrs. Allen and Hanburys, Lond.

B.—Dr. Dudley W. Buxton, Lond.; Colonel R. J. Blackham, C.I.E.; Mr. G. Sherman Bigg, Lond.; Messrs. Butterworth and Co., Lond.; Captain A. Barr, A.V.C.; Captain J. A. Bennett, R.A.M.C.; Captain G. V. Bedford, C.A.M.C.; Sir John Bland-Sutton, Lond.; Dr. J. Blomfield, Lond.; Messrs. W. H. Bailey and Son, Lond.; Messrs. Chas. Birchall, Liverpool; Messrs. T. B. Browne, Lond.; Board of Education, Lond.; Professor E. C. C. Baly, Liverpool; Dr. Charles F. Bolduan, New York; Dr. Gavin Barbour, Lond.; Captain W. Brown, R.A.M.C.; Mr. A. Bacot, Lond.; British Dental Association, Lond., Secretary of; Miss Margaret Breay, Lond.; Mr. Joseph Baxendell, Southport; Dr. F. A. Brooks, Felixstowe; Dr. W. Lyne Blight, Cardiff; Mr. F. E. Beddard, Lond.

C.—Crichton Royal Institution, Dumfries; Captain W. A. Campbell, R.A.M.C.(T.); Lieutenant-Colonel S. Monckton Copeman, R.A.M.C.(T.), Lond.; C. W. C.; Messrs. E. Cook and Co., Lond.; Mr. J. H. Cooper, Paignton; Mrs. Creswell, Lond.; Chymol Co., Lond.; Mrs. Cowan, Glasgow; Captain M. A. Collins; Mr. L. V. Cargill, Lond.; Messrs. J. and A. Churchill, Lond.; Dr. H. Warren Crowe, Plymouth; Dr. I. D. Chepmell, Worthing; Sir John Collie, Lond.; Chadwick Trust, Lond., Secretary of; Mr. F. Lyndon Cooper, Newport, Mon.; Mr. J. F. Colyer, Lond.; Lieutenant Richard Craven, R.A.M.C.; Canadian Contingents, Lond., Office of Director of Medical Service: Mr. Montague Cheale, Uckfield.

D.—Messrs. W. Dawson and Sons, Lond.; Mr. T. N. Darling, Lond.; Messrs. Davies and Co., Lond.; Dr. D. Douglas, Bellshill; Dr. H. Davies, Lond.; Dr. W. A. Daley, Bootle; D. P. H.; Messrs. Dobson, Molle, and Co., Edinburgh; Darenth Industrial Colony, Dartford, Medical Superintendent of; Devonshire Hospital, Buxton; Mr. F. N. Doubleday, Lond.; Mr. J. Leo Delicati, Cotham; Mrs. M. Dollek, Lond.

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I.—Indian Soldiers Fund, Lond.

J.—Mrs. A. Gwilym James, Lond.; Jeyes Sanitary Compounds Co., Lond.; Mr. W. Jones, Liverpool; Mrs. Jones, East Meon; Dr. R. Johnston, Dundee; Mr. W. Warwick Jones, Lond.

K.—Messrs. T. Kerfoot and Co., Bardsley; Messrs. B. Kuhn and Co., Lond.

L.—Messrs. E. Lloyd, Lond.; Dr. C. Lillingston, Peppard Common; Lieutenant J. A. Liley, R.A.M.C.; Leeds City, Town Clerk of; Mr. P. Laver, Colchester; Messrs. H. K. Lewis and Co., Lond.; Local Government Board, Lond.; Rt. Hon. Lord Mayor of London; London Vegetarian Association, Chairman of; Messrs. Laxmichand, Dossabhai and Bros., Rajkot; London (Royal Free Hospital) School of Medicine for Women, Librarian of; Staff-Surgeon L. Lindop, R.N.

M.—Dr. T. H. Macfie, Bognor; Mr. W. F. Matthews, Bristol; Mr. L. Maertens, Lond.; Messrs. C. Mitchell and Co., Lond.; Dr. S. G. Moore, Huddersfield; Major A. Mowat, R.A.M.C., Beccles; Surgeon-General Sir Arthur W. May, K.C.B., Lond.; Mr. W. Lyndon Moore, Newport; Major W. B. McKechnie, I.M.S.; Dr. Rees Morgan, Newport, Mon.; Medical Insurance Agency, Lond.; *Medical Review*, Lond.; Mr. M. S. Madden, Dundrum; Malay States Information Agency, Lond.; Mr. G. Moon, Derby; Dr. Reginald Morton, Lond.; Ministry of Munitions of War, Lond.

N.—New Oxydol Products, Lond.; Mr. Theodore Neild, Leominster; Mr. P. Newell, Margate.

P.—Dr. G. R. M. Pollard, Moffat; Dr. C. T. Parsons, Lond.; Dr. R. Purdon, Belfast; Public Health Laboratory, Manchester, Director of; *Practical Medicine*, Delhi, Publisher of; Messrs. Parke, Davis, and Co., Lond.; Messrs. Pickard, Ive, and Rankin, Lond.; Médecin Major Policard; Pharmaceutical Society of Great Britain, Lond., Secretary of; Pendyffryn Hall Sanatorium, Penmaenmawr, Medical Superintendent of.

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